68

M. xxvii 6m

22500018441

Med
K6096

THE GROUSE IN HEALTH AND IN DISEASE

VOLUME II

THE GROUSE
IN HEALTH AND IN DISEASE

BEING THE FINAL REPORT OF THE
COMMITTEE OF INQUIRY ON GROUSE DISEASE

VOLUME II

APPENDICES

WITH 41 MAPS

LONDON
SMITH, ELDER & CO., 15 WATERLOO PLACE
1911

[*All rights reserved*]

Gov. Pubs.

4993 699

WELLCOME INSTITUTE
LIBRARY

Coll.	WelMOmec
Coll.	
No.	QL

TABLE OF CONTENTS

APPENDICES

PAGE

A.—List of the Committee, Staff, and Local Correspondents 1

B.—List of Subscribers to the funds of the Grouse Disease Inquiry 10

C.—Abstract of Accounts 19

D.—Schedule of Grouse examined during the years 1906-7-8-9 with a Note of Principal Characteristics. By Edward A. Wilson 27

E.—Contents of Crops and Gizzards of Grouse Chicks examined. By P. H. Grimshaw 86

F.—Experiments made upon Hand-reared Grouse. By Edward A. Wilson . . 91

An account of some experiments made at the Committee's Observation Area at Frimley for the purpose of noting—

(1) The effects of grit starvation.
(2) The effects of infection with Strongylosis.
(3) The effects of infection with Coccidiosis.
(4) The body temperatures and weights of healthy and unhealthy Grouse.

G.—Analysis of Weather Conditions, etc., during the period of the Inquiry. By A. S. Leslie and W. Berry 113

H.—Analysis of Reports on Effect of Frost on Eggs and Young of Grouse in the Spring of 1908. By A. S. Leslie 132

I.—Series of Maps showing Incidence of Grouse Disease in Former Years. By A. S. Leslie 137

LIST OF MAPS

SERIES OF MAPS SHOWING INCIDENCE OF GROUSE DISEASE IN FORMER YEARS 141-150

MEAN RAINFALL MAP OF SCOTLAND FOR TWENTY-FIVE YEARS *to face page* 150

APPENDIX A.

LIST OF COMMITTEE, STAFF, AND LOCAL CORRESPONDENTS.

COMMITTEE.

Chairman—LORD LOVAT.

D. W. DRUMMOND.
R. MUNRO-FERGUSON, M.P.
THE MARQUIS OF RIPON.
MACKINTOSH OF MACKINTOSH.
LORD HENRY SCOTT.
Dr WILLIAM SOMERVILLE.
MARQUIS OF TULLIBARDINE.
R. H. RIMINGTON WILSON.
T. H. MIDDLETON, of the Board of Agriculture and Fisheries.

ASSISTED BY

LOUIS COBBETT, M.D., F.R.C.S., Lecturer on Bacteriology to the University of Cambridge.

J. C. F. FRYER, B.A., Cambridge.

G. S. GRAHAM-SMITH, M.D., M.R.C.S., Bacteriologist to Cambridge Town Council, and Lecturer in Hygiene in the University.

PERCY H. GRIMSHAW, F.R.S.E., Assistant Keeper of Natural History Department, Royal Scottish Museum.

R. H. RASTALL, M.A., F.G.S., additional Demonstrator of Geology in the University of Cambridge.

C. G. SELIGMANN, M.B., late Pathologist to the Zoological Society of London.

A. E. SHIPLEY, Sc.D., Cantab., Hon. D.Sc. Princeton, F.R.S., Master of Christ's College, Cambridge, and Reader in Zoology in the University.

H. HAMMOND SMITH, M.D., M.R.C.S., L.R.C.P., F.Z.S.

EDWARD A. WILSON, M.B., F.Z.S., Memb. Brit. Ornith. Union.

H. A. EVANS, M.A., F.Z.S., Memb. Brit. Ornith. Union.

R. T. LEIPER, B.Sc., M.B., Ch.B., F.Z.S., Helminthologist to the London School of Tropical Medicine.

H. B. FANTHAM, D.Sc. Lond., B.A. Cantab., A.R.C.S., F.Z.S., Parasitologist to the Liverpool School of Tropical Medicine, formerly Assistant to the Quick Professor of Biology in the University of Cambridge.

W. BERRY, B.A., LL.B., Memb. Brit. Ornith. Union.

Secretary—A. S. LESLIE, B.A., W.S., 33 Queen Street, Edinburgh.

Assistant Secretary—R. B. FRASER.

LOCAL CORRESPONDENTS.

The numbers opposite each name denote the Sheet of Bartholomew's ½ inch to mile Map.

ABERDEENSHIRE.

22	Colonel Geo. Milne, Logie, Pitcaple	Glenbuchat.
17	Lieut.-Col. D. F. Davidson of Dess	Deeside.
22	Rev. Duncan M. Ross, Glass, by Huntly	Deveronside.
16	Andrew Smith, Esq., Invercauld Estates Office, Ballater	Invercauld Estates.
17	Joseph Farquharson, Esq., R.A.	Finzean, Aboyne.
17	W. E. Nicol, Esq., of Ballogie, Aboyne	Ballogie and Forest of Birse.
16	Donald Fraser, Gamekeeper, Gairnshiel, Ballater	Gairnshiel.
16	James Lundie, Gamekeeper, Corndavon, Crathie	Corndavon.

ABERDEENSHIRE—*continued.*

16	Charles Christie, Esq., Estates Office, Strathdon	Strathdon
16	Major W. L. Forbes, Inverernan, Strathdon	Strathdon.
22	George Bremner, Clashnadarroch, Gartly	Clashnadarroch.
16	George Forbes, Esq., of Inverernan, Strathdon	Strathdon.

ARGYLLSHIRE.

3	J. R. M. Macdonald, Esq., of Largie, Largie Castle, Tayinloan	Kintyre, W.
3	J. Austin Mackenzie, Esq., of Carradale, Kintyre	Carradale.
7	Colonel Burnley Campbell of Ormidale, Colintraive	Cowal.
3	Captain H. Macneal of Ugadale, Lossit, Campbeltown	Kintyre, S.
3	Robert Graham, Esq., of Skipness	Do. E.
3, 6, 7, 11	Alfred E. Lowis, Esq., Chamberlain to Duke of Argyll, Inveraray	Argyll Estates.
7	D. Campbell, Esq., of Inverneill, Ardrishaig	Knapdale.
11	James S. Bontein, Esq., of Glencruitten, Oban	Lorn.
11	H. L. Macdonald, Esq., of Dunach, Oban	Do.
7	Maclachlan of Maclachlan, Castle Lachlan, Strachur	Cowal.

ARRAN.

3	David Reside, Gamekeeper, Dougarie, Shiskine	The Arran Estates.
3	Charles M'Hardie, Gamekeeper, Kilpatrick, Shiskine	Do.
3	Alexander Fraser, Gamekeeper, The Kennels, Brodick	Do.

AYRSHIRE.

4	James B. Thorneycroft, Esq., Netherplace, Mauchline	Dalmellington.
4	A. Fairbairn, Gamekeeper, Wellwood, Muirkirk	Wellwood.
4	Earl of Cassillis, Culzean, Maybole	Carrick.
4	J. B. Fergusson, Esq., of Balgarth, Ayr	Ayr District.
4	Robert F. M'Ewen, Esq., of Bardrochat	Bardrochat District.
4	John M'Dowall, Gamekeeper, Lagafater Lodge, Newluce	Ballantrae District.
4	Alexander Smith, Gamekeeper, Craigmulloch Lodge, Loch Doon, Dalmellington	Loch Doon District.
4	Commander E. Hunter Blair, R.N., Blairquhan	

BANFFSHIRE.

21	W. Steuart Menzies, Esq., of Arndilly	Lower Speyside.
21	J. R. Findlay, Esq., of Aberlour	Mid Speyside.
21	W. Green, Gamekeeper, Glenlivet	Livet Water.
21	Harry Michie, Gamekeeper, Strathavon, Ballindalloch	Strathavon.
21	John Macleod, Gamekeeper, Inchrory	Glenavon.
21, 22	Donald Lindsay, Gamekeeper, Glenfiddich	Glenfiddich, Blackwater, and Glenrinnes.
21, 22	James Warren, Gamekeeper, Lesmurdie, by Huntly	Lower Cabrach.
12.	W. Phemister, Esq., Drumin, Glenlivet	Richmond Estates.

CAITHNESS.

27	D. Mackay, Esq., Freswick Estates, Thurso	Freswick.
27	James Nicolson, Esq., Watten Lodge, Watten	Watten.
27	John Black, Gamekeeper, Braal Castle, Halkirk	Braal.
27	David Black, Gamekeeper, Dalnawillan, Altnabreac	Dalnawillan.
27	James Munro, Gamekeeper, Loch Dhu, Altnabreac	Loch Dhu.
27	Nicol M'Nicol, Gamekeeper, Sandside, Reay, by Thurso	Reay.
27	Duncan Macgregor, Gamekeeper, Dorrery Lodge, Calder	Dorrery.
27	Jas. M'Leod, Gamekeeper, Mybster, by Watten	Mybster.
27	Colonel E. W. Horne of Stirkoke, Wick	Stirkoke.
27	G. King, Esq., Portland Estates Office, Berriedale	Portland Estates.
27	Peter Keith, Esq., Ulbster Estates Office, Thurso	Ulbster Estates.

DUMBARTONSHIRE.

7	Colonel G. J. Ferguson Buchanan of Auchentorlie, Bowling	Kilpatrick Hills.
7	James Lumsden of Arden, Alexandria	Glenfruin District.
7	Alfred E. Lowis, Chamberlain to the Duke of Argyll, Inveraray	Argyll Estates.

DUMFRIESSHIRE.

2	David Lowdon, Gamekeeper, Cairnhill, Springkell, Ecclefechan	Springkell District.
5	A. Smith, Gamekeeper, Holmhead, Langholm	Eskdale.
4	J. Bell, Gamekeeper, Drumlanrig Park, Dumfriesshire	Upper Nithsdale.
4	H. Gladstone, Esq., Capenoch, Thornhill, Dumfriesshire	Nithsdale.

FORFARSHIRE.

16	Sir John G. S. Kinloch, Bart., Glenisla House, Alyth	Glenisla.
13	Claud Ralston, Esq., Glamis, Forfar	Do. and Nowar Districts.
17	David G. Sheill, Esq., Dalhousie Estates Office, Brechin	Dalhousie Estates.
13	Lord Glamis, Glamis, Forfar	Strathmore.

HADDINGTONSHIRE AND BERWICKSHIRE.

9	Thos. Campbell, Gamekeeper, Yester Gifford	Lammermoors.

INVERNESS-SHIRE.

15	G. Malcolm, Esq., jun., Invergarry Estates Office	Invergarry Estates.
15	E. E. Malcolm, Esq., Invergarry Estates Office	Do.
21	J. Davidson, Gamekeeper, Glenkyllachy, Tomatin	Upper Findhorn.
20	J. M'Lennan, Gamekeeper, Fasnakyle, Cannich, Beauly	Fasnakyle.
16	Donald Crerar, Gamekeeper, Ardverikie, Kingussie	Kinloch Laggan.
20	D. Gold, Gamekeeper, Erchless	Erchless.

INVERNESS-SHIRE—*continued.*

21	J. Grierson, Gamekeeper, Moy	Moy.
21	John Ferguson, Gamekeeper, Coignafearn, Tomatin	Upper Findhorn.
21	Chas. D. Stewart, Esq., of Brin, Inverness	Strathnairn.
20	E. G. Fraser-Tytler, Esq., of Aldourie, Inverness	Loch Ness.
21	W. Dalziel Mackenzie, Esq., of Farr, Daviot	Strathdearn and Strathnairn.
16	Sir John Macpherson Grant, Bart., of Ballindalloch, Ballindalloch Castle	Kingussie District and Ballindalloch.
15	Major A. W. Macdonald, Spean Bridge	Lochaber.
15	D. Patterson, Gamekeeper, Dell Lodge, Whitebridge	Dell.
16	John M'Bain, Gamekeeper, Kinrara	Kinrara.
15	Donald Cameron, of Lochiel, Achnacarry	Lochiel.
20	G. Grant, Esq., of Glenmorriston	Glenmorriston.
20	J. Grant Smith, Esq., Seafield Estates Office, Elgin	Glenurquhart and Balmacaan.
20	J. Garrioch, Esq., Beaufort Estates Office, Beauly	Lovat Estates.
20	Wm. Mackay, Esq., Chisholm Estates Office, Inverness	Chisholm Estates.
21	James Cameron, Gamekeeper, Kinveachy, Boat-of-Garten	Kinveachy.
21	Peter Stuart, Gamekeeper, Revack, Grantown	Revack.
15	Thomas Allison, Esq., Fort William	Lochaber.
16	H. B. Macpherson, Esq., Yr. of Balavil, Kingussie	Central Badenoch.
16	John Carver, Gamekeeper, Crubenmore, Newtonmore	Upper Badenoch.
15	Angus Chisholm, Gamekeeper, Glendoe, Fort Augustus	Glendoe.
18	Sir Arthur J. Campbell Orde, Bart., of Kilmory, Lochgilphead	North Uist.

KINCARDINE.

17	Sydney J. Gammell, Esq., Countesswells House, Bieldside, Aberdeen	Fordoun District.
17	Sir John R. Gladstone, Bart., of Fasque, Laurencekirk	Fasque.
17	A. Berowald Innes, Esq., of Raemoir, Banchory	Banchory District.
17	James Wyllie, Gamekeeper, Drumtochty	Drumtochty.

KIRKCUDBRIGHT.

1	Col. J. M. Kennedy, Milton Park Lodge, Dalry	Kirkcudbright.
1	W. M'Call, Gamekeeper, The Great Cross, St Mary's Isle, Kirkcudbright	St Mary's Isle.

LANARKSHIRE.

4	Alex. Telfer, Gamekeeper, Braidlea, Douglas	Douglas.
4	J. Graham, Gamekeeper, Valleyfield, Abingdon, Lanarkshire	Abingdon.
4	Watt, Gamekeeper, Lamington	Lamington.
4	James Gray, Gamekeeper, Leadhills	Leadhills.

MIDLOTHIAN.

8	R. C. Cowan, Esq., Craigiefield, Penicuik	Pentlands.

MORAYSHIRE.

21	J. Grant Smith, Esq., Seafield Estates Office, Elgin	Grantown District.
21	J. W. H. Grant, Esq., Elchies	Carron.
21	D. M'Queen, Gamekeeper, Carron	Do.
21	Sir Ford North, Laggan	Laggan.
21	J. Munro, Gamekeeper, Laggan	Do.
21	W. Esson, Gamekeeper, W. Elchies	W. Elchies.
21	J. B. Hankey, Esq., Knockando	Knockando.
21	J. Shand, Gamekeeper, Knockando	Do.
21	D. Irving, Gamekeeper, Altyre, Forres	Altyre.
21	J. M'Lean, Gamekeeper, Dallas Lodge, Forres	Dallas.
21	W. Maclaren, Esq., Altyre Estates Office, Forres	Altyre Estates.
21	J. H. Wheatley, Berkswell Hall, Coventry	Lochindorb.
21	Peter Stuart, Gamekeeper, Cromdale	Cromdale.
21	John Cruickshank, Gamekeeper, Tulchan Lodge, Advie	Tulchan.

PEEBLESSHIRE.

5	Alex. Sim, Gamekeeper, Cramilt Lodge, Selkirk	Meggat Water.
5	M. Jackson, Gamekeeper, Traquair, Innerleithen	Tweed Valley.
5	G. Deans Ritchie, Esq., of Chapelgill, Broughton	Upper Tweed.
5	James Lait, Hallmanor, Peebles	Manor Water.

PERTHSHIRE.

12	W. S. Fothringham, Esq., of Murthly	Murthly Estates.
12	C. A. J. Butter, Faskally Estate Office, Pitlochry	Faskally Estates.
12	Marquis of Breadalbane, Taymouth Castle	Central Perthshire.
12	Col. Stewart, of Ardvorlich, Lochearnhead	Ardvorlich.
12	Thomas Ferguson, Gamekeeper, Ardvorlich, Finaglen, St Fillans	Do.
12	James Carnegie, Esq., of Stronvar, Balquhidder, Perthshire	Balquhidder.
12	David Purves, Gamekeeper, Drumour, Strathbraan, Dunkeld	Strathbraan.
12	John Stewart, Gamekeeper, Loch Kennard, Aberfeldy	Loch Kennard.
12	Alex. Stewart, Gamekeeper, Logiealmond Lodge, Harrietfield, Perth	Glenalmond.
12	Captain C. H. Graham Stirling, of Strowan, Comrie	Comrie District.
12	Duncan Macdiarmid, Gamekeeper, Garth Lodge, Aberfeldy	Garth Estates.
12, 16	Hugh Mitchell, Esq., Pitlochry	Pitlochry.
16	Claud Ralston, Esq., Glamis, Forfar	Moulin and Kirkmichael District.
12	James Stewart, Gamekeeper, Auchmore House, Killin	Killin.

PERTHSHIRE—*continued.*

12	Alex. Fraser, Gamekeeper, Bolfracks House, Aberfeldy	Aberfeldy.
12	Charles Forbes, Gamekeeper, Rohallion, Murthly	Rohallion.
16	J. M'Lauchlan, Gamekeeper, Littleton, Fonab, Pitlochry	Fonab.
12	Sir Neil Menzies, Bart., of Menzies, Castle Menzies, Aberfeldy	Menzies Estates.
16	Duncan Stewart, Gamekeeper, Blair Castle Kennels, Blair Atholl	Atholl Forest, etc.
16	Duncan Stewart, Gamekeeper, Fealar, Enochdhu, Pitlochry	Fealar.
16	Archibald M'L. Marshall, Esq., Bleaton Hallet, Blairgowrie	Blackwater Valley, etc.
16	James Macbeth, Gamekeeper, Dalnaspidal	Glengarry.
16	Charles M'Lauchlan, Gamekeeper, Edradour, Pitlochry	Pitlochry District.
12	Archibald Macbeth, Gamekeeper, Kinnaird, Ballinluig	Ballinluig District.
12, 16	James Young, Gamekeeper, Tullymet, Ballinluig	Tullymet and Loch Oshnie.
12	Alexander Dewar, Gamekeeper, Riechip Lodge, Dunkeld	Dunkeld District.
12	A. Macdonald, Meggernie Estate Office, Aberfeldy	Glenlyon.
16	Sir James Ramsay, Bart., of Bamff, Alyth	Bamff.
12	Robert Connal, Gamekeeper, Castle Menzies, Aberfeldy	Castle Menzies.
16	Frank Macdonald, Gamekeeper, Foss, by Pitlochry	Foss.
12	David Macpherson, Gamekeeper, Rannoch Lodge, Rannoch Station	E. Rannoch.
12	Ewen Cameron, Dall, Rannoch Station	S. Rannoch.
12	C. E. S. Chambers, Esq., of Cardney, Dunkeld	Dunkeld District.
12	John MacLean, Gamekeeper, Glenlochy Lodge, Killin	Glenlochy.
12	David Dempster, Gamekeeper, Craganour, Rannoch	W. Rannoch.
12	Donald M. MacNicol, Dunalastair, Perthshire	Dunalastair.
12	Evan M. MacGregor, Ardchoille, Perth	Dalguise.

ROSS-SHIRE.

25	John A. Brooke, Esq., Fearn Lodge, Ardgay	Easter Ross.
23	C. Orrock, Esq., Stornoway	The Lewis.
19	J. M'Caskill, Esq., Gairloch Estate Office	Wester Ross.
20	D. Davidson, Esq., of Tulloch, Tulloch Castle, Dingwall	Mid Ross
25	G. Wotherspoon, Esq., Cromartie Estate Office, Kildary	Do.
21	J. Henderson, Esq., Rosehaugh Estates, Fortrose	Black Isle
21	G. St Quinton, Esq., Kincurdy, Fortrose	Do.
20	Sir Arthur G. R. Mackenzie, Bart., of Coul, Strathpeffer	Mid Ross
20, 25	T. W. Cuthbert, Esq., Achindunie, Alness	Easter Ross
25	C. W. Dyson Perrins, Esq., of Ardross, Alness	Do.
20	W. F. Gunn, Esq., Strathpeffer	Mid Ross.
20	J. J. R. Meiklejohn, Esq., Novar Estate Office, Evanton	Do.
24	Osgood H. Mackenzie, Esq., of Inverewe, Inverewe, Poolewe	Wester Ross
21, 25	Capt. R. Macleod, of Cadboll, Invergordon Castle	Easter Ross
19	R. J. Bowerman, Esq., of Killilan, Stromeferry	South-West Ross.

ROXBURGHSHIRE.

5	M. Connacher, Gamekeeper, Newlands, Newcastleton	Liddesdale.
5	David Davidson, Esq., Edgerston, Jedburgh	Jed Forest.
5	T. Bell, Gamekeeper, Teinside Lodge, Hawick	Upper Teviotdale.
5	Sir Henry Smith, Chisholm, Hawick	Borthwick Water.

SELKIRKSHIRE.

5	J. Martin, Gamekeeper, Shielshaugh, Selkirk	Ettrick and Yarrow.
5	Alex. Sim, Gamekeeper, Cramilt Lodge, Selkirk	St Mary's Loch.
5	Wm. R. Ovens, Esq., of The Peel, Clovensfords	Tweed and Yarrow.

STIRLINGSHIRE.

12	Capt. E. Bolton, Duchray Castle, Aberfoyle	Aberfoyle District.
7	J. Fergusson, Gamekeeper, Blairgar, Blanefield	Duntreath.
7	Robt. Stewart, Gamekeeper, Buchanan Castle, Drymen, Glasgow	Buchanan
7	C. J. Ferguson, Gamekeeper, Dalmary Lodge, Gartmore	Aberfoyle and Gartmore.
8	Simpson, Gamekeeper, Touch, Stirling	E. Stirling.
8	Sam Sinclair, Gamekeeper, Port of Menteith	Flanders Moss.

SUTHERLAND.

25	Jas. F. Hardie, Esq., Skibo Estate Office, Dornoch	Skibo Estates.
25	D. M'Lean, Esq., Jun., Sutherland Estate Office, Golspie	Sutherland Estates.
26	John Morrison, Esq., Sutherland Estate Office, Tongue	Do.
26	W. Wallace, Inchnadamph Hotel, Loch Assynt	Assynt District.

WIGTOWNSHIRE.

1	J. Marchbanks, Gamekeeper, Lochinch, Castle Kennedy	Luce Valley.
1	J. A. A. Wallace, Esq., Lochryan, Cairnryan	Lochryan District.
1	M. Macleod, Gamekeeper, Penninghame, Newton Stewart	Newton Stewart.
1	D. Lamb, Gamekeeper, Cumloden, Newton Stewart	Do.

ENGLAND.

CHESHIRE.

12	Wyndham E. Hale, Esq., Derby Estate Office, Preston	Cheshire.

CUMBERLAND.

2	T. Bowes, Gamekeeper, The Flatt, Roadhead, Carlisle	Bewcastle District.
3	R. H. Horrocks, Esq., Salkeld Hall, Langwathly	Alston District.
3	W. J. Pearson, Gamekeeper, Moorhouse, Alston, Cumberland	Do.

CUMBERLAND—*continued.*

3	R. D. Marshall, Esq., Castlerigg Manor, Keswick	Keswick District.
3	Alex. Watt, Esq., Muncaster Estates, Ravenglass, Carnforth	Egremont District.
3	Richard Watson, Gamekeeper, Oak Tree Hall, Castle Carrock, Carlisle	Carlisle District.

DERBY.

9, 13	Percy Shaw, Esq., Fern, Buxton	Buxton District.
9, 13	A. Payne Gallwey, Esq., Estate Office, Castle Hill, Bakewell	Longshaw Moor.
9, 13	E. Edmund Barnes, Esq., Ashgate Lodge, Chesterfield	Woodlands District.

DURHAM.

4	H. L. Fife, Esq., Raby Estates Office, Staindrop, Darlington	Raby.
4	John W. Hildyard, Horsley House, Stanhope	Stanhope District.

LANCASHIRE.

8, 9	Francis E. Fraser, Esq., Worsthorne Estates Office, Todmordon Road, Burnley	Worsthorne Estates.
9	Sir John O. S. Thursby, Bart., Ormerod House, Burnley	Towneley Moors.
6	E. L. Starkie, Esq., Huntroyd, Padiham, Burnley	Pendle Hill.
5	Wyndham E. Hale, Esq., Derby Estate Office, Preston	Abbeystead District.
5	Richard K. Fenton, Esq., Dutton Manor, Longridge, Preston	Longridge District.
5	G. W. Lloyd, Esq., Estate Office, Croxteth, Liverpool	Abbeystead District.

NORTHUMBERLAND.

2, 3, 4	Thomas Dickinson, Gamekeeper, Allenhead, Allendale	Allendale.
2	G. Murray, Gamekeeper, Askerton, Brampton, Cumberland	Gilsland District.
2	William A. Avery, Gamekeeper, Reiver's Well, Cragside, Rothbury	Coquetdale.
2	James Nixon, Gamekeeper, Parkend, Wark-on-Tyne	N. Tyne.
2	H. Goodfellow, Gamekeeper, Greenyside Cottage, Gilsland	Butterburn.
2	William Hunter, Farmer, Hedsleyside Estate, Bellingham	N. Tyne.
2	G. Parker, Gamekeeper, Donkleywood House, Falstone	Do.
2	Alexander Telfer, Gamekeeper, Ray, Kirkwhelpington	Ray.
2	Humphrey J. Willyams, Esq., Alnwick Castle Estates Office	N. Tyne.
2	Edward Joicey, Esq., Blenkinsopp Hall, Haltwhistle	Blanchland District.
2	M. Portal, Esq., Estate Office, Beaufront Castle, Hexham	Whickhope.

YORKSHIRE.

9	Jas. Whitehead, Gamekeeper, Isle of Skye, Holm Bridge, near Huddersfield	Saddleworth and Wessenden Head Moors.
4	Robert Bayles, Gamekeeper, Wemmergill, Middleton in Teesdale	Wemmergill.

YORKSHIRE—*continued.*

6	Alfred Downs, Esq., Bolton Abbey, Skipton	Bolton Abbey.
6	O. H. Wade, Esq., Studley Park, Ripon	Ripon District.
4	J. Swale, Gamekeeper, The Grange, Grinton, Richmond	Swaledale.
4, 6	E. S. Broughton, Esq., Hawes, Yorks	Hawes District.
6	Capt. C. S. Greenwood, Swarcliff, Ripley, Yorkshire	Nidderdale.
4	Sir P. C. Millbank, Bart., Barningham Park, Barnard Castle	
6	R. B. Barrett, Esq., Skipton Castle, Yorkshire	Skipton District.
6	William Prior, Gamekeeper, Deeside, Dent, Sedbergh	Deeside.
9	Clement Blackburn, Esq., Toothill, Brighouse, Yorks	Grassington.
6	S. A. L. Swale, Esq., Highfield Lodge, Settle	Settle District.
4	Jas. Usher, Gamekeeper, Scar House, Arkengarthdale, Richmond	Arkengarthdale.
4	Tom Alderson, Gamekeeper, Birk Park, Reeth, Richmond	Reeth.
4, 6	A. W. Chaytor, Esq., Scrafton Lodge, Middleham, R.S.O.	Middleham and Coverdale.
4, 6	Thos. Firbank King, Esq., Wynbury, Leyburn	Aysgarth.
4	J. Harries, Esq., Newby Estate Office, Ripon	Askrigg.
4	E. W. Stanyforth, Esq., Kirkhammerton Hall, York	Arkengarthdale.
5	The Honble. Wm. Brooks, Crawshaw Hall, Rawtenstall	Hareden.
9	Henry Coverdale, Esq., Duke of Norfolk's Estate Office, Sheffield	Sheffield District.
7	Capt. The Honble. J. Dawnay, Congham Lodge, King's Lynn	Danby.
7	W. Wharton, Esq., Skelton Castle, Skelton in Cleveland	Cleveland District.
9	W. T. Lipscomb, Savile Estate Office, Dewsbury	Rishworth and Wadsworth Moors.
4	John Croad, Ellerton Abbey, Richmond, Yorks	Ellerton District.
6	H. Garnett Orme, Esq., Tarn House, near Skipton-in-Craven	Langstrothdale.

WESTMORLAND.

3	Capt. W. H. Parkin, Lowther, Penrith	Shap District.
4	John Richardson, Gamekeeper, Bleathgill, Stainmore, Kirkby Stephen	Kirkby Stephen District.
5	Christopher W. Wilson, Esq., Rigmadden Park, Kirkby Lonsdale	Kirkby Lonsdale District.
6	R. B. Barrett, Esq., Skipton Castle, Yorkshire	Barras District.
3	W. J. Pearson, Gamekeeper, Moorhouse, Alston, Cumberland	Alston District.

WALES.

11	A. Wynne Corrie, Esq., Park Hall, Oswestry	Ruabon Hills.
16	F. W. Addie, Esq., Powis Castle Estate Office, Welshpool	Powis Moors, Mountgomery.
11	F. G. Tuck, Esq., Estate Office, Wynnstay, Ruabon	Wynnstay Estate.

APPENDIX B.

LIST OF SUBSCRIBERS TO THE FUNDS OF THE GROUSE DISEASE INQUIRY.

George S. Albright, Esq., of Drumochter	£8	6	0
W. Warde Aldam, Esq., of Ederline	15	15	0
Claud A. Allan, Esq., Kilmahew	20	0	0
The Lord Allendale	20	0	0
Sir J. Heathcoat Amory, Bart.	15	0	0
Mrs Angelo, of Culachy	15	0	0
Major Anstruther-Gray, of Kilmany	2	1	0
Adam Archibald, Esq., Overshiels, Stow	6	6	0
Andrew Arthur, Esq., of Lamslaw	2	2	0
The Duke of Atholl, K.T.	25	0	0
Robert D. J. Mein Austin, Esq.	10	6	0
James E. B. Baillie, Esq., of Dochfour	35	0	0
H. R. Baird, Esq., of Durris	35	0	0
J. G. A. Baird, Esq., of Wellwood	40	0	0
W. A. Baird, Esq., of Erskine and Lennoxlove	2	2	0
James W. Barclay, Esq., of Glenbuchat (deceased)	4	4	0
Thomas Barclay, Esq., Edinburgh	40	0	0
The Lord Barnard	30	0	0
Major Stanley L. Barry, Pitsford Hall	3	3	0
W. P. Beale, Esq., K.C., M.P.	6	6	0
The Duke of Bedford, K.G.	250	0	0
The Lord Henry Bentinck	12	12	0
J. Mackay Bernard, Esq., of Dunsinnan	2	2	0
Clement Blackburn, Esq., Brighouse	7	4	0
Commander E. Hunter Blair, R.N., of Blairquhan	5	5	0
R. H. Blair, Esq., Edinburgh	1	1	0
Charles H. Bouck, Esq., Newburgh	1	11	0
Cedric R. Boult, Esq., of Shennas	17	2	0
The Hon. T. A. Brassey	2	0	0
The Marquis of Breadalbane, K.G.	4	0	0
Sir John Brigg, M.P.	3	0	0
Sir Theodore Brinckman, Bart.	5	0	0

Capt. A. Brodie, of Lethen (deceased)	£9	0	0
Charles Brook, Esq., Beverley, Yorks	8	0	0
John A. Brooke, Esq., Ardgay	23	10	0
J. B. Close Brooks, Esq., Chelford, Cheshire	30	0	0
J. A. Harvie Brown, Esq., of Dunipace	11	0	0
J. T. Gilpin Brown, Esq., Sedbury, Richmond	9	6	0
The Duke of Buccleuch, K.G., K.T.	25	0	0
Col. J. G. Fergusson Buchanan, of Auchentorlie	5	0	0
J. Hamilton Buchanan, Esq., of Leny	6	6	0
Sir George Bullough, Kinloch Castle, Isle of Rum	5	0	0
The Marquess of Bute	30	0	0
A. Butter, Esq., Pitlochry	4	4	0
C. A. J. Butter, Esq., of Cluniemore	20	0	0

The Earl Cairns	3	0	0
Sir Alex. Campbell, of Aberuchill	2	1	0
Rev. A. J. Campbell, D.D., Easter Garrows and Shian	1	1	0
Col. A. M'Iver Campbell, of Asknish	2	2	0
Col. H. Burnley Campbell, of Ormidale	6	6	0
The Earl of Cassillis	3	3	0
The Earl of Cawdor (deceased)	30	0	0
Col. Chaloner, M.P., Gisboro Hall, Yorks	12	12	0
C. E. S. Chambers, of Cardney	1	1	0
J. J. Chapman, Esq., Whitby	14	14	0
Col. A. H. Charlesworth, Ferne, Salisbury	25	0	0
Mrs Chisholm, of Chisholm (deceased) and Miss Chisholm of Chisholm	35	0	0
Thomas Christy, Esq., Lhanbryde	3	12	0
William M. Christy, Esq., Watergate, Emsworth	7	0	0
Percy Chubb, Esq., Auchlecks	6	0	0
Charles J. Clay, Esq., Hollybush Hall, near Burton-on-Trent	6	6	0
Capt. H. H. Clowes, Norbury, Ashbourne	8	0	0
George Coats, Esq., Forest of Glentana, Aboyne	15	0	0
W. A. Coats, Esq., of Dalskairth	40	0	0
John D. Cobbold, Esq., Holywells	20	5	0
The Lord Colebrooke	10	0	0
Wm. H. Coltman, Esq., of Blelack and Deskrie	9	3	0
Captain Christian Combe, Strathconon	15	0	0
Sir Henry Cook, Edinburgh	8	4	0
Sir George A. Cooper, Bart.	10	0	0
A. Wynn Corrie, Esq., Park Hall, Oswestry	15	0	0
W. F. Courthope, Esq., Birchin Lane, E.C.	10	10	0
C. W. Cowan, Esq., Dalhousie Castle, Bonnyrigg	25	0	0
Arthur J. Cox, Esq., Glenmarkie, Alyth	15	0	0
Major John Crabbe, Closeburn	5	0	0

G. Craig-Sellar, Esq., Ardtornish	£25	0	0
C. J. Edmondstoun Cranstoune, Esq., of Corehouse	4	4	0
The Lord Crawshaw (deceased)	20	0	0
Wm. Cree, Esq., Fingask	4	4	0
Alfred Crewdson, Esq., Cairnshiel	15	0	0
W. C. Cripps, Esq., Invercroskie, Pitlochry	3	3	0
Sir Donald Currie, Bart. (deceased)	10	0	0
Capt. J. H. Cuthbert, Beaufront Castle, Hexham	10	0	0
Capt. F. J. Dalgety, Glenmazeran, Tomatin	8	8	0
The Earl of Dalhousie	30	15	0
Lord Stormonth Darling	10	5	0
F. A. Darwin, Esq., County Hall, Wakefield	6	6	0
Col. D. F. Davidson, of Dess, Kincardine O'Neil, Aberdeenshire	4	3	0
D. Davidson, Esq., Edgerston, Jedburgh	5	5	0
F. B. Debenham, Esq., Cheshunt Park, Herts	8	8	0
H. G. Devas, Esq., Hartfield, Hayes, Kent	8	0	0
The Duke of Devonshire (deceased)	15	0	0
The Duke of Devonshire	40	0	0
Sir John Dewar, Bart., Abercairney	10	10	0
The Viscount Doune	15	0	0
W. E. Downing, Esq., Hagley, near Stourbridge	6	6	0
Mrs Duff-Dunbar, Ackergill Tower, Wick	3	3	0
Commander H. Dunbar-Dunbar-Rivers, R.N., of Glen of Rothes	2	2	0
F. B. Eastwood, Esq., Drumchork, Aultbea	3	3	0
Charles J. Ebden, Esq., Baldslow Place, Baldslow, Sussex	15	0	0
The Earl of Eglinton and Winton	6	6	0
Trustees of the late E. Ellice, of Invergarry	10	7	0
The Lord Elphinstone	15	0	0
Alex. Crum Ewing, Esq., of Strathleven	3	0	0
G. Farquhar, Esq., Blairfindy Lodge	1	1	0
A. H. Farquharson, Esq., of Invercauld	18	0	0
Joseph Farquharson, Esq., R.A., Porchester Gardens, W.	19	0	0
Rt. Hon. R. Farquharson, M.D., Finzean	4	4	0
Sir Edward Johnson-Ferguson, Bart., of Springkell	12	12	0
E. A. Johnson-Ferguson, Esq., Wiston Lodge, Lamington	9	5	0
R. C. Munro Ferguson, Esq., of Novar, M.P.	30	0	0
J. B. Fergusson, Esq., of Balgarth	2	0	0
Bernard A. Firth, Esq., Norton Hall, Sheffield	15	0	0
R. C. Dundas Firth, Esq., Sheffield	20	0	0
Robert Fleming, Esq., Chesterfield Gardens, London, W.	5	0	0

J. D. Fletcher, Esq., of Rosehaugh	£8	8	0
W. Forbes, Esq., of Callendar, Falkirk	2	0	0
B. J. H. Forder, Esq., Pitmain, Kingussie	6	6	0
Col. W. Steuart Fothringham, of Fothringham	3	0	0
H. F. Fryer, Esq., The Priory, Chatteris	2	2	0
Sydney J. Gammell, Esq., of Drumtochty	15	0	0
F. A. Garden, Esq., of Troup	1	1	0
J. S. Gibbons, Esq., Boddington Manor, Cheltenham	5	5	0
Sir John Gilmour, Bart.	55	0	0
Sir John R. Gladstone, Bart.	20	0	0
Sir Thomas Glen-Coats, Bart.	50	0	0
E. S. Gooch, Esq., Torcastle, Banavie	8	8	0
Joseph Gould, Esq., Kindrogen	4	2	0
Sir Richard Graham, Bart., of Netherby	20	0	0
James N. Graham, Esq., of Carfin	5	0	0
The Marquis of Granby	1	1	0
F. M. S. Grant, Esq., Mereleigh, Chelford	8	0	0
Col. George Smith Grant, Lecht	4	4	0
J. M. Grant, Esq., of Glenmoriston	15	0	0
Robert Grant, Esq., Muckerach Lodge, Grantown-on-Spey	6	6	0
M. H. Gray, Esq., Glenquaich Lodge	5	0	0
Capt. C. S. Greenwood, Swarcliff, Yorks	18	18	0
Stuart Hall, Esq., of Killean	8	8	0
Everard Hamboro, Esq., of Gannochy, Edzell	10	0	0
The Duke of Hamilton	20	0	0
The Lord Hamilton of Dalzell, K.T.	5	0	0
Gilfrid Hartley, Esq., Scotby, Carlisle	8	8	0
The Hon. S. Hastings	2	1	0
Gilbert Hastings-Campbell, Esq., Glenlee Park	2	2	0
C. H. Holme, Esq., of Rathburne, Duns	10	0	0
The Earl of Home, K.T.	15	0	0
J. H. Milne-Home, Esq., Canonbie	2	0	0
Col. T. A. Henry, Haffield, Ledbury	5	0	0
W. Walker Hood, Esq., Cardiff	2	2	0
Capt. John Hope, R.N., St Mary's Isle	12	12	0
The Lord Howard of Glossop	4	4	0
The Hon. B. Howard	4	4	0
The Earl Howe	12	12	0
C. P. Hughes, Esq., Middleton Hall, Wooler	2	11	0
Charles E. Hunter, Esq., Wemmergill	10	0	0
The Earl of Ilchester	6	0	0
H. H. Inglis, Esq. (deceased), and A. W. Inglis, Esq.	15	0	0

A. Berowald Innes, Esq., Raemoir House, Banchory	£3	0	0
Lord Inverclyde	15	0	0
Sir Robert Jardine, Bart., of Castlemilk	12	0	0
Edward Joicey, Esq., Blenkinsopp Hall, Haltwhistle	15	0	0
W. C. Jones, Esq., Corndavon, Ballater	15	0	0
Col. J. M. Kennedy, Milton Park Lodge, Dalry	26	0	0
T. R. Ker, Esq., Douglaston, Milngavie	2	0	0
Henry Kidd, Esq., Lowood, Melrose	5	2	0
Sir John J. S. Kinloch, Bart. (deceased)	5	5	0
The Lord Lamington	2	1	0
Lt.-Col. Legh, High Legh Hall, Knutsford	3	3	0
The Lord Leith, of Fyvie	12	0	0
Col. A. Y. Leslie, of Kininvie	1	1	0
The Lord Lilford	25	0	0
The Marquis of Linlithgow (deceased)	20	0	0
Lochiel	6	0	0
The Earl of Lonsdale	21	0	0
H. Heywood Lonsdale, Esq., 22 Hill Street, W.	5	5	0
The Lord Lovat	20	0	0
Capt. Francis Lyell, Buckmans, Oakwood Hill	6	0	0
J. W. Makant, Esq., Breconhill Tower, Longtown	5	0	0
C. M. Makgill-Crichton, Esq., of Lathrisk	10	0	0
Col. Malcolm, C.B., of Poltalloch	19	2	0
H. C. Malkin, Esq., of Corrybrough, Tomatin	3	3	0
T. H. Mann, Esq., Brenachoil, Trossachs	40	0	0
The Earl of Mansfield (deceased)	4	0	0
The Earl of Mansfield	12	0	0
Wilson Mappin, Esq., Thornbury, Sheffield	50	0	0
A. M'L. Marshall, Esq., of Bleaton Hallet	15	0	0
H. B. Marshall, Esq., of Quarter	2	0	0
Bradley Martin, Esq., Balmacaan	25	5	0
Sir Spencer Maryon Wilson, Bart.	31	8	0
J. Francis Mason, Esq., M.P., Eynsham Hall, Witney	35	0	0
Sir Kenneth Matheson, Bart.	14	0	0
T. O. Mathieson, Esq., 1 Park Gardens, Glasgow	30	0	0
Robert Maule, Esq., Edinburgh	4	4	0
Sir John Stirling Maxwell, Bart.	25	0	0
George Melville, Esq., Edinburgh	2	2	0
Charles T. Menzies, Esq., Kames, Greenlaw	4	4	0
Sir Neil Menzies, Bart., of Menzies (deceased)	15	0	0

W. G. Steuart Menzies, Esq., of Arndilly	£21	0	0
H. Michie, Esq., Nottingham	7	7	0
The Lord Middleton	12	0	0
Sir P. C. Milbank, Bart.	19	2	0
J. A. Milne, Esq., Ardmiddle House, Turriff	1	0	0
The Duke of Montrose, K.T.	18	0	0
The Earl of Moray	20	0	0
H. Morrison, Esq., 34 Cadagon Place, W.	5	0	0
W. Morrison, Esq., Malham Tarn, Langcliffe	23	0	0
Sir John Edwards Moss, Thamesfield	5	0	0
Stewart C. Munro, Esq., of Teaninich, Alness	5	0	0
Charles J. Murray, Esq., of Lochcarron	4	4	0

F. R. M‘Connel, Esq., Nunwick, Homshaugh-on-Tyne	22	2	0
A. C. M‘Corquodale, Esq., Kildonan Lodge	10	0	0
The Lord Macdonald	15	0	0
D. P. M‘Donald & Sons, Fort William	3	3	0
J. R. Moreton Macdonald, Esq., of Largie	1	1	0
L. Macdonald, Esq., of Skeabost (deceased)	15	0	0
T. Martin Macdonald, Esq., of Barquillean	5	0	0
E. S. Macdougal, Esq., of Sonachan (deceased)	2	0	0
R. F. M‘Ewen, Esq., Bardrochat	25	0	0
Johnston M‘Fie, Esq., M.D. Morven	7	2	0
The Lord Mackenzie	2	2	0
Sir Allan Mackenzie, Bart.	5	0	0
Sir Arthur G. R. Mackenzie, Bart.	17	17	0
Sir Kenneth Mackenzie, Bart., of Gairloch	15	0	0
W. Dalziel Mackenzie, Esq., of Farr	20	0	0
J. M. Mackinnon, Lanfine	2	0	0
Mackintosh of Mackintosh	30	0	0
MacLeod of MacLeod	6	0	0
A. Macpherson of Clunie	15	0	0
Ewen F. Macpherson, Esq., Edinburgh	3	0	0
George Macpherson, Esq., Edinglassie Lodge	5	0	0

Walter Neilson, Esq., Lairdmannoch Lodge	7	3	0
John H. Nelson, Esq., Greshornish	2	2	0
Thomas A. Nelson, Esq., of Achnacloich	15	0	0
William Newall, Esq., Lochavich	4	4	0
W. E. Nicol, Esq., of Ballogie	14	14	0
The Duke of Norfolk, K.G.	15	0	0
The Duke of Northumberland, K.G.	30	0	0

F. Menteith Ogilvie, Esq., of Barcaldine	10	10	0

Robert A. Ogilvie, Esq., Sheffield Terrace, Campden Hill	£5	5	0
F. S. Oliver, Esq.	3	3	0
The Lord Onslow	5	0	0
Wm. R. Ovens, Esq., of Peel, Clovenfords	11	11	0
Robert P. Page, Esq., Crieff	5	0	0
Herbert Parke, Esq., Withnell Fold	3	3	0
A. B. Paton, Esq., Hareshawmuir	7	7	0
Arthur L. Payne, Esq., Dundreggan Lodge	6	6	0
Lieut.-Col. J. Pearse-Hobbs, Galston	1	1	0
The Lord Penrhyn	15	0	0
The Lord Penrhyn (deceased)	10	0	0
E. H. L. Penrhyn, Esq., Gatehouse	5	0	0
C. W. Dyson Perrins, Esq., of Ardross	46	10	0
W. H. Peto, Esq., Dunkinty, Elgin	4	4	0
John S. Phipps, Esq.	5	0	0
Sir T. M. S. Pilkington, Bart.	12	0	0
Col. Henry Platt, C.B., of Gruinards	6	2	0
The Duke of Portland, K.G.	60	0	0
The Hon. Mrs Portman, Aberarder Lodge	1	1	0
The Hon. E. W. B. Portman, Hestercombe (deceased)	30	0	0
The Earl of Powis	30	0	0
Kenneth Prescott, Esq., Cuaich, Dalwhinnie	10	10	0
Herbert Pullar, Esq., Bridge of Earn	14	14	0
Miss Alice Radcliffe, 21 Berkeley Square	25	15	0
Miss E. Lucy Ramsay, Cairnmore	3	3	0
Sir James Ramsay, Bart.	6	1	0
Sir John Ramsden, Bart.	35	0	0
Captain Bernard Rhodes, Farraline	3	0	0
The Duke of Richmond and Gordon, K.G.	35	0	0
J. Richmond, Esq., Delvine, Murthly	12	12	0
The Marquis of Ripon	25	0	0
Alex. F. Roberts, Esq., Fairnilie, Selkirk	5	4	0
Edgar W. Robertson, Esq., of Trinafour and Auchleeks	11	11	0
R. P. Robertson-Glasgow, Esq., of Craigmyle	6	6	0
The Duke of Roxburghe, K.T.	25	0	0
J. S. Ruston, Esq., Monk's Manor, Lincoln	7	7	0
G. A. C. Sandeman, Esq., of Fonab, Pitlochry	8	8	0
Major C. H. Sanford, Beeslack, Milton Bridge	7	0	0
Arthur D. Sassoon, Esq., Albert Gate	15	0	0
The Lord Savile	10	10	0
J. A. Scott, Esq., and Robert Scott, Esq., Peebles	15	0	0

Sir Samuel Scott, Bart.	£10	0	0
The Dowager Countess of Seafield	25	0	0
C. H. Shaw, Esq., Downie Park, Kirriemuir	5	0	0
Sir Hugh Shaw Stewart, Bart., of Ardgowan	15	0	0
Sir William Shipley	1	1	0
Fred. Shoolbred, Esq., Hove	25	0	0
Rupert Shoolbred, Esq., of Wyvis, Evanton	10	10	0
F. G. Sinclair, Esq., of Mey, Wick	1	0	0
Commander S. A. Sinclair, of Dunbeath	1	1	0
Robert Skirving, Esq., of Cobairdy	1	1	0
J. Beckwith Smith, Esq., Aberarder	21	6	0
J. H. Smith, Esq., Dunachton (deceased)	10	0	0
Lt.-Col. Sir Henry Smith	4	4	0
H. H. Riley Smith, Esq., Tadcaster	5	0	0
Reginald J. Smith, Esq., K.C.	15	15	0
H. S. C. Smithson, Esq., of Inverernie	20	0	0
Col. W. Smithson, Frendraught	6	6	0
W. Sopper, Esq., of Dunmaglass	15	0	0
Sir Walter Spencer Stanhope, Bart., Barnsley	14	14	0
E. W. Stanyforth, Esq., Kirkhammerton Hall (Scar House Shoot)	6	6	0
W. S. Steel, Esq., of Philiphaugh	30	0	0
Captain Steuart, of Ballechin	1	5	0
Charles D. Stewart, Esq., of Brin	8	0	0
Col. J. Stewart, of Ardvorlich	2	0	0
Sir Mark M'Taggart Stewart, Bart.	26	1	0
Capt. A. Stirling, of Strathgarve	9	0	0
Capt. Archibald Stirling, of Keir	24	0	0
C. Stirling, Esq., Englefield Green	1	11	0
Commander G. M. Stirling, R.N., Craigbarnet	1	10	0
Major W. Stirling, of Fairburn	21	6	0
W. H. St Quintin, Esq., Rillington, York	13	8	0
The Earl of Strathmore	27	2	0
C. Stratton, Esq., Heathfield House, Bletchington	6	0	0
The Duke of Sutherland, K.G.	30	0	0
Frank Sykes, Esq., Borrobol, Kinbrace	14	14	0
Thomas Taylor, Esq., Chipchase Castle	5	0	0
J. H. Tempest, Esq., Dalguise	6	6	0
Sir Tristam T. Tempest, Bart. (deceased)	15	0	0
Sir E. P. Tennant, Bart.	25	0	0
H. J. Tennant, Esq., M.P.	9	9	0
Frederick Thomson, Esq., Erriboll	2	2	0
Sir M. Mitchell Thomson, Bart.	10	0	0
J. B. Thorneycroft, Esq., Carnlarg	40	0	0

Lt.-Col. W. Murray Thriepland, of Fingask and Toftingall	£4	0	0
Sir John Thursby, Bart.	15	0	0
Major T. Harrison-Topham, Bury St Edmunds	6	0	0
Joseph Torbock, Esq., Crakenthorpe Hall	10	0	0
A. E. C. Trotter, Esq., of Bush	25	0	0
G. G. Turnbull, Esq., Abbey St Bathans	6	6	0
The Lord Tweedmouth (deceased)	10	0	0
E. G. Fraser Tytler, Esq., of Aldourie	12	0	0
Sir Robert Usher, Bart.	25	0	0
Edward Wagg, Esq., Glenlochay, Killin	15	0	0
Major P. J. Waldron, Agsacre, North Berwick	1	1	0
Frederick Walker, Esq., Ravensthorpe Manor, Thirsk	7	1	0
J. G. Walker, Esq., Balkail, Glenluce	6	0	0
J. A. A. Wallace, Esq., Lochryan	20	0	0
Vernon Watney, Esq., Fannich, Ross-shire	20	0	0
James Watt, Esq., Rothesay Terrace, Edinburgh	5	5	0
The Earl of Wemyss	25	0	0
The Duke of Westminster	10	0	0
The Lord Wharncliffe	15	0	0
W. H. A. Wharton, Skelton Castle	30	0	0
J. H. Wheatley, Berkswell Hall, Coventry	20	0	0
Major G. Dalrymple White, Glenkilrie	1	1	0
Græme Whitelaw, Esq., 1 Lowther Gardens, W.	35	0	0
Lewis D. Wigan, Esq., Kilmory	4	4	0
Sir Archibald Williamson, Bart., M.P.	9	9	0
The Lord Willoughby de Eresby	25	10	0
Sir John Wilson, Bart., of Airdrie	2	2	0
R. H. Rimington Wilson, Esq., Broomhead Hall	30	0	0
G. W. Wolff, Esq., M.P.	5	2	0
Capt. J. L. Wood, Dunstable	4	4	0
S. Hill Wood, Esq., Moorfield, Glossop	15	0	0
Woodlands Association	15	0	0
E. W. Wormald, Esq., Kilkerran, Ayrshire	10	0	0
A. O. Worthington, Esq., Killin	1	1	0
John P. Wright, Esq., Albyn Place, Edinburgh	10	0	0
Thomas Edward Yorke, Beverley Hall, Yorks	18	2	0
William Younger, Esq., of Ravenswood	10	10	0
The Marquis of Zetland, K.T.	5	0	0

APPENDIX C.

ABSTRACT OF ACCOUNTS.

For Year from 1st January to 31st December 1905.

Charge.

I. Subscriptions and donations for 1905	£663 2 6
II. Interest on deposit receipts	2 9 3
III. Miscellaneous receipts	9 0 3
	£674 12 0

Discharge.

I. Fees and salaries		£250 0 0	
II. Expenses of meetings		28 11 10½	
III. Expenses of scientific apparatus, etc.		39 11 9	
IV. Expenses of stationery, etc.		62 2 7	
V. Miscellaneous—			
1. Secretary's outlays	£51 19 0½		
2. Dr Seligmann's outlays	6 4 4		
3. Field Observer's outlays	78 10 6		
4. Dr Hammond Smith's outlays	6 9 2		
		143 3 0½	
			523 9 3
Balance at credit of Committee			£151 2 9

ABSTRACT OF ACCOUNTS.

For Year from 1st January to 31st December 1906.

Charge.

I.	Balance at credit of the Committee at 31st December 1905	£151 2 9
II.	Subscriptions and donations	822 4 6
III.	Interest on deposit receipts	6 18 9
IV.	Miscellaneous receipts	8 17 0
		£989 3 0

Discharge.

I.	Fees and salaries		£478 7 0	
II.	Stationery, typewriting, and printing		86 18 1	
III.	Cost of sending out circulars		26 8 1	
IV.	Cost of Observation Area		14 0 10	
V.	Miscellaneous—			
	1. Secretary's outlays	£60 8 5		
	2. Dr Wilson's outlays	56 1 4		
	3. Dr Hammond Smith's outlays	10 16 3		
	4. Dr A. E. Shipley's outlays	16 8 11		
	5. Dr Seligmann's outlays	9 5 5		
			153 0 4	
				758 14 4
	Balance at credit of the Committee			£230 8 8

ABSTRACT OF ACCOUNTS.

For Year from 1st January to 31st December 1907.

Charge.

I. Balance at credit of the Committee at 31st December 1906	£230 8 8
II. Subscriptions and donations	679 6 6
III. Interest on deposit receipts	25 13 0
	£935 8 2

Discharge.

I. Fees and salaries		£384 17 2	
II. Stationery, typewriting, and printing		39 18 0½	
III. Cost of sending out circulars		29 12 7	
IV. Cost of Observation Area		41 3 2	
V. Miscellaneous—			
1. Secretary's outlays	£47 14 5½		
2. Accounts incurred by scientists for preservation of skins, etc.	13 0 0		
3. Dr Wilson's outlays	152 13 11		
4. Dr Hammond Smith's outlays	21 16 7		
5. Dr A. E. Shipley's outlays	25 17 1		
6. Dr Seligmann's outlays	16 8 1		
7. Scientific assistant's outlays	31 1 0		
		308 11 1½	
			804 2 1
			£131 6 1
Add—Amount received on account of subscriptions for 1908 paid in advance			260 19 5
Balance at credit of Committee			£392 5 6

ABSTRACT OF ACCOUNTS.

For Year from 1st January to 31st December 1908.

Charge.

I. Balance at credit of the Committee at 31st December 1907		£392 5 6	
Less—Amount received in 1907 applicable to 1908		260 19 5	£131 6 1
II. Subscriptions and donations—			
Amount received in 1907 applicable to 1908		£260 19 5	
Total amount received in 1908	£750 17 0		
Whereof applicable to 1909	24 6 6	726 10 6	987 9 11
III. Interest on deposit receipts			5 2 5
IV. Miscellaneous receipts			0 7 6
			£1,124 5 11

Discharge.

I. Fees and salaries		£468 5 0	
II. Stationery, typewriting, and printing		30 18 10	
III. Cost of sending out circulars and Interim Report		38 13 11	
IV. Cost of Observation Area		48 17 0	
V. Miscellaneous—			
1. Secretary's outlays	£84 17 9½		
2. Scientific apparatus, supplies, etc.	21 4 6½		
3. Dr Wilson's outlays	134 8 10		
4. Dr Hammond Smith's outlays	6 1 10		
5. Dr A. E. Shipley's outlays	19 18 0		
6. Mr Percy H. Grimshaw's outlays	20 4 2		
7. Scientific assistant's outlays	29 12 1		
		316 7 3	
			903 2 0
			£221 3 11
Add—Amount received on account of subscriptions for 1909 paid in advance			24 6 6
Balance at credit of Committee			£245 10 5

ABSTRACT OF ACCOUNTS.

For Year from 1st January to 31st December 1909.

Charge.

I. Balance at credit of the Committee at 31st December 1908	£245 10 5	
Less—amount received in 1908 applicable to 1909	24 6 6	
		£221 3 11
II. Subscriptions and donations—		
Amount received in 1908 applicable to 1909	£24 6 6	
Total amount received in 1909	730 8 3	
		754 14 9
III. Interest on deposit receipts		1 11 11
IV. Miscellaneous receipts		0 5 3
		£977 15 10

Discharge.

I. Fees and salaries		£561 4 6	
II. Stationery, typewriting and printing		17 2 6	
III. Cost of sending out circulars		3 14 0	
IV. Cost of Observation Area		30 1 4	
V. Miscellaneous—			
1. Secretary's outlays	£58 9 10½		
2. Scientific apparatus, supplies, etc.	6 11 0½		
3. Dr E. A. Wilson's outlays	85 11 0½		
4. Dr Hammond Smith's outlays	5 3 0		
5. Dr A. E. Shipley's outlays	7 14 8½		
6. Mr L. Cobbett's outlays	12 15 9		
7. Mr Percy H. Grimshaw's outlays	1 19 3		
8. Dr H. B. Fantham's outlays	23 13 11½		
9. Dr R. T. Leiper's outlays	7 14 8½		
10. Scientific assistant's outlays	2 17 5		
		212 10 9	
			824 13 1
Balance at credit of Committee			£153 2 9

ABSTRACT OF ACCOUNTS.

For Year from 1st January to 31st December 1910.

Charge.

I. Balance at credit of the Committee at 31st December 1909	£153 2 9
II. Subscriptions and donations—	
Amount received in 1910	528 6 3
III. Interest on deposit receipts	4 13 2
IV. Final Report—	
Payment received of subscription for Final Report	1 11 6
	£687 13 8

Discharge.

I. Fees and salaries		£363 1 2	
II. Stationery, typewriting, and printing		70 14 8	
III. Cost of sending out circulars		9 13 7½	
IV. Cost of Observation Area		18 12 11	
V. Miscellaneous—			
1. Secretary's outlays	£36 8 7		
2. Dr E. A. Wilson's outlays	34 12 2		
3. Dr Hammond Smith's outlays	4 9 9		
4. Dr A. E. Shipley's outlays	5 17 6		
5. Dr H. B. Fantham's outlays	4 13 3		
		86 1 3	
			548 3 7½
Balance at credit of Committee			£139 10 0½

ABSTRACT OF ACCOUNTS.

FROM 1ST JANUARY TO 12TH JUNE 1911.

Charge.

I.	Balance due to Committee at 31st December 1910	£139	10	0½
II.	Subscriptions and donations—			
	Amount received from 1st January to 12th June 1911	9	13	6
III.	Interest on deposit receipts	4	11	5
IV.	Final Report—			
	Payments received of subscriptions for Final Report	6	9	6
V.	Frimley Observation Area—			
	Price received for Grouse sold	30	18	0
		£191	2	5½

Discharge.

I.	Fees and salaries				£84	0	0			
II.	Stationery, typewriting and printing				14	14	0			
III.	Cost of sending out circulars				5	2	2			
IV.	Cost of Observation Area				39	15	6½			
V.	Final Report—									
	To account of cost of preparation of plates, etc.,				327	16	9			
VI.	Miscellaneous—									
	1. Secretary's outlays	£22	18	7½						
	2. Dr Hammond Smith's outlays	3	13	0						
					26	11	7½			
								498	0	1
	Balance at debit of Committee							£306	17	7½

SUMMARY of Income and Expenditure as shown in the Foregoing Abstracts for the period from 1st January 1905 to 12th June 1911.

Income.

I.	Subscriptions and donations	£4,444 17 11	
II.	Interest on deposit receipts	50 19 11	
III.	Miscellaneous receipts	18 10 0	
IV.	Final Report subscriptions	8 1 0	
V.	Grouse sold	30 18 0	
			£4,553 6 10

Expenditure.

I.	Fees and salaries	£2,589 14 10	
II.	Stationery, typewriting, printing, etc.	322 8 8½	
III.	Cost of sending out circulars, Interim Report, etc.	113 4 4½	
IV.	Cost of Observation Area	192 10 9½	
V.	Miscellaneous, including outlays of staff, expenses of meetings, cost of scientific apparatus, etc.	1,314 9 0	
VI.	Final Report—to account of plates	327 16 9	
			4,860 4 5½
	Balance at debit of Committee, at 12th June 1911		£306 17 7½

Note.—There has to be added to the foregoing debit balance various outstanding liabilities, estimated at about £250; but an effort is being made to obtain further subscriptions to meet this item. It is hoped also that there may be a profit on the sale of the Report, but the expenses of production will be so heavy that it is feared this profit will not suffice to meet the whole liabilities of the Committee, or to remunerate the members of the Staff for their services during the concluding stages of the Inquiry.

APPENDIX D.

SCHEDULE OF GROUSE RECEIVED AND EXAMINED DURING THE YEARS 1906-7-8-9.

SIGNS USED:—

COLUMN
1 Reference number, refers to dissection note books, skin of the bird if preserved, and any tube of material preserved for section.
2 Sign H=healthy; D=diseased; I=incipient disease; ♂=male; ♀=female; juv.=young; ad.=adult. If sex sign alone is given the bird is adult.
3 Date of collection, not date of death always.
4 Weight in ounces (Avoirdupois). Sign ... means record not taken or lost.
5 County.

COLUMN
6 Sign K=killed purposely; all others specified as to the manner of their death.
7 Shows whether the skin was preserved or not.
8 to 11 Show whether or not the worms specified were found in the bird, (v); a=abundant; f=full of; m=masses; p=plenty; v.a=very abundant.
12 Shows whether the crop contained food (v); or none (o).
13 Gives diagnosis as to cause of death.

Note.—It will be seen that the Records for the first dissections are scanty and irregular. This is due to the fact that all the earlier books were lost in a piece of luggage which was stolen in Glasgow station, and was never recovered.

Strongylosis is meant whenever the diagnosis is given as "worms," "enteritis from worms," "cæcal enteritis," "disease," "Grouse Disease," or "incipient disease."

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
57	H ♂	22.1.06	26¼	Midlothian	K	v	...	...	...	...	v	...
59	H ♂	17.1.06	19¼	Argyll	K	v	...	...	...		v	Accidental
61	H ♀	22.1.06	22	Ross	K	v	...	...	...		v	
64	H ♂	15.1.06	21½	Wales	K	v	...	...	...			
65	H ♂	15.1.06	21½	do.	K	v	...	...	...		v	
66	H ♀	17.1.06	22¼	Westmoreland	K	v	...					
67	H ♂	22.1.06	24	Caithness	K	v	...				v	
68	H ♂	15.1.06	22	Wales			...				v	
70	H ♂	1.06	24	Caithness	K						v	
79	H ♂	25.1.06	25	Inverness	K	v						
81	H ♂	26.1.06	22¼	Derby	K	v					v	
83	H ♀	26.1.06	22	Durham	K	v					v	
85	H ♂	25.1.06	24¼	Dumfries	K	v					v	
88	H ♂	25.1.06	22¼	York	K	v					v	
90	H ♂	29.1.06	25¾	Dumbarton	K	v					o	
91	... ♀	6.2.06	...	Cumberland	K	v					v	
93	H ♂	7.2.06	23	Wales (Montgomery)	K	v					v	
96	H ♂	15.2.06	24½	Westmoreland	K	v					v	
98	H ♂	15.2.06	21½	Wales (Montgomery)	K	v					v	

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
100	H ♂	9.2.06	24½	Caithness	K	v					o	
102	H ♂	12.2.06	23½	do.	K	v						
103	... ♂	26.2.06	...	Yorks								
104	H ♂	25.2.06	21¼	Midlothian	K	v					o	
105	H ♂	22.2.06	22½	Dumfries	K	v					o	
106	H ♂	1.3.06	23½	Wales (Montgomery)	K	v					v	
108	H ♂	3.3.06	24½	Dumbarton	K	v					v	
110	... ♀	6.3.06	18½	Westmoreland	K	v					v	
112	H ♂	6.3.06	24¼	Derby	K	v					o	
116	H ♂	6.3.06	24	Caithness	K	v					o	
117	H ♂	2.3.06	24¼	Argyll	K	v					v	
119	H ♂	12.3.06	24¾	Midlothian	K	v					v	
121	H ♂	12.3.06	25	Dumbarton	K	v					v	
123	H ♂	15.3.06	23¾	Westmoreland	K	v					v	
125	H ♂	15.3.06	19	Midlothian	K	v					o	Accidental
126	H ♂	21.3.06	22	Perth	K	v					v	
128	H ♂	22.3.06	19	Dumfries	K	v					v	
130	H ♀	22.3.06	20½	...	K	v					o	
131	H ♂	24.3.06	23	Inverness	K	v					v	
133	H ♀	26.3.06	24½	Westmoreland	K	v					v	
135	H ♀	28.3.06	20½	Dumfries	K	v					o	
137	H ♂	28.3.06	23	Wales (Montgomery)	K	v					o	
139	H ♂	29.3.06	24½	Caithness	K	v						
140	H ♂	30.3.06	24¼	do.	K	v					v	
143		16.8.05	...	Banff								
149	... ♂	3.6.05	...	Lanark	K	v						
150	... ♂	13.6.05	...	Roxburgh	K	v						
151	... ♂	18.6.05	...	Dumfries	K	v						
176	D ♀	11.4.06	17½	Ross	Found dead	v			v		v	Accidental
178	H ♂	8.4.06	22½	Argyll	K	v			v		v	
180	H ♂	14.4.06	22¼	Dumbarton	K	v			v		v	
182	I ♀	16.4.06	21¼	do.	Found dying	v					o	"Pricked"
183	H ♂	17.4.06	23½	Westmoreland	K	v			v		v	
185	I ♂	18.4.06	19½	Moray	Found dying	v			v		v	Accidental
187	H ♂	18.4.06	21¾	Westmoreland	K	v			v		v	
189	I ♂	25.4.06	14½	Dumbarton	Found dying	v	v		v		o	"Pricked" and worms
191	I	25.4.06	20½	Selkirk	Found dying	v					v	Accidental
193	D ♂	27.4.06	20½	do.	Found dead	v	v	v	v	v	v	Worms
195	D ♂	5.5.06	17½	do.	do.	v	v	o	v	v	o	do.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichoe.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
197	D ♂	7.5.06	16¾	Selkirk	Found dead	v	v	o	v	v	v	Worms
199	D ♂	7.5.06	17	do.	do.	v	v	o	v	v	o	do.
201	H ♂	3.5.06	22½	Westmoreland	K	v					v	
203	D ♀	7.5.06	21	Selkirk	Found dead	v	v	o	v	v	v	Worms
205	H ♂	11.5.06	25	Midlothian	K	v	v	o	o	v	v	
207	... ♂	16.5.06	...	Selkirk	Found dying							Worms
208	... ♂ juv.	17.5.06	...	do.	Drowned	v					v	Accidental
210	H ♂	15.5.06	24⅓	Dumfries	K	v					v	
212	H ♂	15.5.06	23⅓	do.	K	v					v	
214	♀	18.5.06	25½	Midlothian	Found dead	v	v	o	v	v	v	Worms
216	D ♂	15.5.06	15¾	Selkirk	do.	v	v	o	v	v	v	do.
217	D ♀	12.5.06	15	Lanark	do.	v	v	o	v	v	v	do.
220	H ♂	19.5.06	20¼	Dumbarton	K	v	v	o	v	v	v	
222	... ♂ juv.	22.5.06	...	Derbyshire	Found dead	v					v	
224	H ♂	22.5.06	22¼	Argyll	K	v					v	
226	I ♀	22.5.06	20½	Roxburgh	Found dying	v	v		v	v	v	Worms
228	♀	21.5.06	25½	Moray	do.	v					v	Disease
230	... ♂ juv.	23.5.06	...	Derby	Found dead	v					v	
232	... ♂	25.5.06	...	Selkirk	do.	v	v			v	o	Worms
233	... ♀ juv.	29.5.06		Peebles	do.	v					o	
234	... ♂ juv.	7.6.06		Dumfries	K	v					v	
236	... ♂ juv.	7.6.06		do.	K	v					v	
238	... ♂ juv.	8.6.06		Perth	Found dead	v					o	
240	D ♂	6.6.06	12½	Caithness	do.	v					o	Accidental
241	... ♂ juv.	14.6.06		Dumfries	K	v					*Calluna* tops and Fern	
243	... ♀ juv	14.6.06		do.	K	v					v	
245	... ♂ juv.	14.6.06		Stirling	K	v					v	
247	... ♂ juv.	14.6.06		do.		v					v	
249	... ♂ juv.	19.6.06		Ross	K	v					*Calluna* tops, few small flies	
251	... ♂ juv.	19.6.06		do.	K	v					*Calluna* tops, berries, small insects	
253	...juv.	23.6.06		Stirling	K	v					v	
255	... ♂ juv.	21.6.06		Ross	K	Spirit					o	
257	...juv.	21.6.06		do.	K	do.					o	
259	...juv.	21.6.06		do.	K	v					o	
260	...juv.	22.6.06		do.	Found dead	Spirit						
262	...juv.	22.6.06		do.	K	do.						

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
264	... ♂ juv.	22.6.06		Inverness	K	v					*Calluna*, Fern and small insects	
266	... ♂ juv.	25.6.06		Ross	K	v					*Calluna* Rush-heads, one insect	
268	... ♂ juv.	25.6.06		do.	K	v					*Calluna*, Blaeberry leaves and berries, mosscapsules, many small gnats	
270	... juv.*	28.6.06		Perth	Found dead						o	
271	... juv.*	28..606		do.	do.						o	
272	... ♀	28.6.06		Ross	Found dead						o	
273	... ♀	28.6.06		do.	do.						o	Maggoty
274	... juv.	6.7.06		Derby	K	v						
275	... juv.*	9.7.06		Dumfries	Found dead							
276	... juv.	3.7.06		Caithness	K	Spirit						
277	... juv.	3.7.06		do.	K	do.						
278	... juv.	3.7.06		do.	K	do.						
279	... juv.	3.7.06		do.	K	do.						
280	... juv.	3.7.06		do.	K	do.						
281	... juv.*	6.7.06		Perth	Found dead	v						Maggoty
282	... juv.	17.7.06		Dumfries	K	v						do.
283	... juv.	17.7.06		do.	K	v						
284	... ♀	21.7.06		Inverness	K	v					*Calluna*, Blaeberry leaves, Rush-heads, *Tormentilla* seed heads	
284a	... ♂	27.7.06		Ross	Found dead	v						
285	... ♀ juv.	21.7.06		Inverness	K	v					*Calluna*, Blaeberry leaves, Rush-heads and various seeds	
285a	... juv.	25.7.06		Dumbarton	K	v						
286	... ♂ juv.	6.8.06		Argyll	Found dead						Very few *Calluna* tips	Gape Worms

* Hand reared.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
287	... ♀	15.8.06	...	Midlothian	Found dying	v	v				o	"Pricked" and Worms
288	H ♀	16.8.06	23½	Aberdeen	do.	v					o	Ectopic gestation
289	... ♂ juv.	16.8.06	16	Dumfries	K	v					v	
290	... ♀ juv.	16.8.06	15	do.	K	v					v	
291	... juv.	14.8.06	13	Dumbarton	K							
292	... ♂ juv.	29.7.06	...	Inverness		v						
293	... ♀ juv.	29.7.06	...	do.	K	v					v	
295	I ♂	29.8.06	15	Perth	Found dying							Worms
296	... ♂	31.7.06	...	Inverness	K	v						
297	... ♂	31.7.06	...	do.	K	v						
298	I ♀	18.8.06	18	Perth	Found dying	v	v	o	v	v	*Tormentilla* seed heads, few bits *Calluna Ranunculus* seed	Enteritis from Worms
299	I ♀	20.8.06	19	Ayr	do.	v	v	o	v	v	v	Worms
300	I ♀	20.8.06	18	do.	do.	v	v	o	v	v	*Tormentilla* seeds, Rush-heads, Daddy long-legs, various seeds	do.
301	... ♀	21.8.06	...	Caithness							o	
302	H ♂	6.9.06	30	Peebles	K	v					v	
303	... ♀ juv.	7.9.06	16½	Yorks.	K	v					v	
304	... ♀ juv.	7.9.06	15½	do.	K						v	
305	... ♀ juv.	7.9.06	17	do.	K	v					v	
306	H ♀	7.9.06	20	do.	K	v					Rush-heads, Rush-bugs, Fern and various	
307	I ♀	8.9.06	16½	Argyll.	Found dying	v					v	Worms
308	I ♀	8.9.06	21½	do.	do.	v					v	do.
309	...	8.9.06	19¼	do.	do.							do.
310	H ♀ juv.	14.9.06	23	Inverness	K	v						
311	H ♂	14.9.06	24	do.	K	v					v	
312	♀	14.9.06	19	do.	K	v						
313	... ♀	14.9.06	...	Dumbarton	K	v						
314	... ♂	16.9.06	...	Ross	Found dying	v	v	o	o	v	v	Worms
315	... ♂	14.9.06	...	do.	do.	v	v	o	o	v	v	
316	...	15.9.06	...	Stirling	K				v			

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
317	... ♂	19.9.06	...	Argyll	Found dead							"Pricked" and Worms
318	... ♀	20.9.06	...	Dumfries	K	v						
319	... ♂	20.9.06	...	do.	K	v						
320	...	28.9.06	...	Perth	K				v			
321		28.9.06		do.	K				v	v		
322		27.9.06		Argyll	Found dying		v		v	v		Worms
323	I ♀	28.9.06	17	Ross	do.	v						
324	I ♂	28.9.06	15	do.	do.	v						do.
325	...	28.9.06	16	do.	do.							
326	H ♂	28.9.06	25	do.								
327		28.9.06		do.								"Pricked"
328		28.9.06		do.							v	
328a		29.9.06		Perth	K			v			v	
329	... ♂	2.10.06	19½	Inverness	K	v						
330	H ♂	2.10.96	23	do.	K	v						
331	H ♂	2.10.06	23½	do.	K	v						
332	H ♂	2.10.06	24	do.	K							
333	H ♂	2.10.06	24	do.	K							
334	H ♀	2.10.06	19½	do.	K	v						
335	...	22.9.06	...	Yorks.	Found dying							
335a	...	22.9.06	...	do.	do.	v						
336	... ♂	10.10.06	...	Stirling	K	v						
337	I ♂	10.10.06	22	Northumberland	do.		v		v	v	v	Sebaceous disease
338	H ♂	11.10.06	25	Inverness	K	v				v	v	
339	I ♂	14.10.06	20½	Ross	Found dying		v		v	v	Oats *Calluna*, Blaeberry black seeds	
340	H ♀ juv.	15.10.06	20½	do.	K	v	v	v			v	
341	*											
342	H ♂	18.10.06	23	Ross	K	v				v	v	
343	♂	13.10.06	...	Caithness	K					o	o	
344	♀	20.10.06	...	Ross	K	v				o	o	
345	♂	16.10.06	...	Caithness	Found dead	v				v	*Calluna*, shoots and seed-heads, insects' legs	
346	♂	22.10.06	...	Ross	K	v					o	
347	♂	23.10.06	...	do.	K						Full of oats and husks	

* Blackgamo.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
348	♂	23.10.06	...	Ross	K				v		Great deal of oats and husks : few *Calluna* tops and seed-heads	
349	D ♀	20.10.06	15	Yorks.	Found dying	v					Full	Probably worms
350	...	30.10.06	...	Sutherland	do.							
351	D ♂	9.11.06	19¼	do.	Found dead						Full of rush-heads, *Calluna*	Probably worms
352	D ♂	29.10.06	19	Caithness	do.						v	Probably worms
353	...	20.10.06	...	Stirling							v	
354	... ♂	30.10.06	18									Accidental
355	*											
356	... ♂	20.10.06	...	Perth	K	v					Fern : *Calluna* shoots and flower	
357	... ♀	20.10.06	...	Caithness		v					Fern : *Calluna* tops and seed-heads	
358	... ♂	28.8.06	...	Stirling	Found dead	v						
359	... ♀	27.8.06	...	do.	do.	v						
360	...	20.8.06	...	do.	do.	v						
361	...	23.10.06	16	Yorks.	do.							
362	... ♂	9.10.06	...	do.	K	v					v	
363	... ♀	9.10.06	...	do.	K	v					Red cranberries, *Calluna* and seed-heads	
364	... ♂	9.10.06	...	do.	K	v					v	
365	... ♀	4.9.06	...	Stirling	K	v						
366	*											
367	*											
370	... ♀	...	...	Northumberland							v	
371	... ♂	...	...	Selkirk							v	
372	H ♀	25.10.06	21	Yorks.	Found dead	Spirit					v	Prob. worms, and accident

* Blackgame.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
395	*											
402	... ♂	11.11.06	...	Roxburgh							v	
403	... ♂	30.11.06	...	do.							v	
404	H ♂	30.11.06	22	Dumfries	K	v					v	
405	H ♀	30.11.06	21	do.	K	v					v	
406	*											
407	H ♂	7.12.06	27½	Inverness	K	v					v	
408	H ♂	7.12.06	25	do.	K	v					v	
409	♀	30.11.06	19	Dumbarton	K	v						
410	*											
411	*											
412	... ♂	13.12.06	...	Argyll	Found dying	v					v	Worms
413	*										v	
414	H ♀	31.12.06	21	Dumbarton	K	v						
415	H ♀	28.12.06	25	Inverness	K	v					v	
416	H ♂	2.1.07	25	Dumbarton	K	v					v	
417	H ♂	31.12.06	23½	Caithness	K	v			v	v	v	
418	H ♀	31.12.06	21¼	do.	K	v			v	v	v	
419	H ♂	31.12.06	26	Perth	K	v				v		
420	H ♀	2.1.07	24	do.	K	v			v	v		
421	H ♀	31.12.06	22	Inverness	K	v	v		v	v	v	
422	H ♂	3.1.07	26½	Dumfries	K	v			v	v		
423	H ♀	3.1.07	21	do.	K	v	v			v	v	
426	... ♀	4.1.07	...	Dumfries	K				v	v		
427	H ♀	2.1.07	21½	Inverness	K	v			v	v	v	
428	H ♂	2.1.07	22½	do.	K	v	v		v	v		
429	H ♂	5.1.07	28	do.	K	v			v	v	v	
430	H ♂	5.1.07	27½	do.	K	v				v	v	
431	H ♂	7.1.07	23	Caithness		v			v	v	v	
432	H ♂	8.1.07	25	Isle of Mull	K	v		v	v	v	v	
433	H ♂	7.1.07	20	Inverness	K	v	v		v	v	v	
434	H ♂	7.1.07	24	do.	K	v			v	v		
435	H ♂	7.1.07	24	do.	K	v	v		v	v		
436	...	7.1.07	...	do.	K						v	
533	†											
534	H ♂	14.1.07	22½	do.	K	v					v	
535	H ♂	14.1.07	24	do.	K	v			v	v		
536	H ♂	16.1.07	22½	Northumberland	K	v		v	v	v	v	
537	H ♀	17.1.07	20	do.	K	v	v			v	v	
538	H ♀	16.1.07	21	Inverness	K	v	v		v	v	v	
539	H ♂	16.1.07	25½	do.	K	v			v	v	v	

* Blackgame. † Caporcailzie.

No.	Sex.	Date.	Weight in ozs. (Av.)	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
541	H ♀	10.1.07	21	Inverness	K	v				v	v	
542	*											
543	...	1.07	...	Argyll	Found dead						v	
544	H ♂	19.1.07	24	Stirling	K	v	v		v	v		Accidental
545	H ♂	17.1.07	21½	Argyll	K	v			v	v	v	
546	*											
547	H ♂	23.1.07	26½	Northumberland		v				v		
552	*											
554	H ♂	31.1.07	26½	do	K	v			v	v	v	
555	... ♀	31.1.07	...	Dumbarton	K				v	v	v	
556	H ♂	2.2.07	25	Lanark	K	v		v	v	v	v	
557	H ♂	7.2.07	24½	Inverness	K	v			v	v	v	
558	H ♂	7.2.07	27	do.	K	v						
559	H ♀	7.2.07	23	Yorks.	K	v				v	v	
560	H ♂	8.2.07	26½	do.	K	v						
561	H ♀	8.2.06	21½	Kincardine	K	v			v	v	v	
562	H ♂	7.2.07	24½	Moray	K	v					v	
563	H ♂	7.2.07	24	Yorks.	K	v			v	v		
564	H ♂	11.2.07	25	do.	K	v	v			v		
565	H ♂	11.2.07	20½	do.	K	v						
566	H ♂	12.2.07	21	Kirkcudbright	K	v	v	v	v	v		
567	H ♂	8.2.07	22	Westmoreland	K	v			v	v	v	
569	H ♂	10.2.07	23½	Northumberland	K	v			v	v	v	
570	H ♀	13.2.07	22	Wales	K	v					v	
571	H ♀	13.2.07	22	Caithness	K	v			v	v	v	
572	H ♂	13.2.07	24	do.	K	v			v	v	v	
573	*											
574	H ♂	16.2.07	24½	Inverness	K	v			v	v	v	
575	H ♀	16.2.07	20½	do.	K	v			v	v	v	
576	H ♂	19.2.07	27	Wales	K	v			v	v	v	
577	H ♂	18.2.07	24	Yorks.	K	v	v		v	v	v	
578	H ♀	19.2.07	23½	do.	K	v			v	v	v	
579	H ♂	19.2.07	24	do.	K	v			v	v	v	
580	I ♀	20.2.07	19½	Dumfries	K	v			v	v	v	
581	H ♂	20.2.07	24½	do.	K	v					v	
582	... ♂	22.2.07	...	Yorks.	K	v			v	v		
584	H ♂	22.2.07	23	do.	K	v						
585	H ♂	22.2.07	25	do.	K	v					v	
586	H ♂	22.2.07	24½	Argyll	K	v		v	v	v	v	
587	H ♂	25.2.07	20	Northumberland	K	v			v	v	v	
589	H ♂	25.2.07	25	Perth	K	v					v	

* Blackgame.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop ample.	Cause of death.
590	H ♂	25.2.07	25½	Perth	K	v			v	v	v	
591	H ♂	2.2.07	25	do.	K	v	v		v	v	v	
592	I ♂	25.2.07	20	do.	Found dying	v	v		v	v	v	Worms
593	H ♂	26.2.07	25	Northumberland	K	v			v	v	v	
594	H ♀	26.2.07	23½	do.	K	v			v	v	v	
595	H ♂	28.2.07	20	Dumbarton	K	v						
596	H ♂	28.2.07	26½	do.	K	v	v		v	v		
597	H ♂	28.2.07	24	Perth	K	v			v	v	v	
598	H ♂	28.2.07	22½	Sutherland	K	v					v	
599	H ♂	28.2.07	23½	do.	K	v						
600	H ♂	1.3.07	23½	Westmoreland	K	v					v	
601	♀	4.3.07	14½	Yorks.	K	v	v			v		Worms
602	♀	4.3.07	14½	do.	K	v	v		v	v		Worms
603	D ♂	28.2.07	22	Argyll	Found dead	v					v	Very doubtful Grouse Disease
604	H ♀	8.3.07	20½	Yorks.	K	v	v		v	v	v	
605	H ♂	7.3.07	23	do.	K	v			v	v	v	
606	H ♂	7.3.07	23	Inverness	K	v	v		v	v	v	
607	... ♂	2.3.07	...	do.		v						
608	H ♂	11.3.07	22⅓	Wales		v						
609	♂	11.3.07	23¼	Kirkcudbright	K	v						
610	♂	11.3.07	...	do.	K	v						
611	♂	11.3.07	...	Northumberland	Found dead							Accidental
612	♂	14.3.07	...	Yorks.	K	v						
613	♂	14.3.07	...	do.	K	v						
614	♂	15.3.07	...	Aberdeen	K	v			v	v		
615	♀	13.3.07	...	Kincardine	K	v						
616	♂	18.3.07	...	Inverness	K	v						
617	♂	18.3.07	...	do.	K	v			v	v		
618	♀	4.3.07	...	Yorks.	K	v						
619	♂	4.3.07	...	do.	K	v		v	v	v		
620	♀	4.3.07	...	do.	Found dead	v		v	v	v		Accidental
621	♂	15.3.07	...			v	v		v	v		
622	♂	15.3.07	...			v	v	v	v	v		
623	♀	19.3.07	...	Dumbarton	K	v		v		v		
624	♂	19.3.07	...	Arran	K	v	v		v	v		
625	♂	19.3.07	...	do.	K	v		v	v	v		
626	♂	18.3.07	...	Argyll	K	v						
628			...				v		v	v		
630	♂	18.3.07	...	Wales	K	v	v		v	v	v	
631	♂	18.3.07	...	do.	K	v	v		v	v		
632	♀	18.3.07	...	do.	K	v			v	v		

No.	Sex.	Date.	Weight in ozs. Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
633	♂	19.3.07	...	Moray	K	v						
634	♂	19.3.07	...	Inverness		v			v	v		
635	♂	19.3.07	...	do.		v	v		v	v	v	
636	♂	19.3.07	...	do.		v					v	
637	♀	19.3.07	...	Perth	K	v	v		v	v	v	
638	♂	19.3.07	...	do.	K	v		v	v	v		
639	♂	19.3.07	...	Kincardine	K	v	v		v			
640	♂	19.3.07	...	Dumfries	K	v	v		v			
641	... ♀	19.3.07	...	do.	K	v	v		v	v	v	
642		19.3.07	...	Ross	K		v	v	v	v		
643	... ♂	19.3.07	...	do.	K	v	v		v	v	v	
644	...	19.3.07	...	do.	K		v		v	v	v	
645	H ♂	19.3.07	25	do.	K	v	v		v	v	v	
646	... ♂	19.3.07	...	Yorks.	K	v					v	
647	... ♂	16.3.07	...	Inverness	K	v		v	v	v		
648	... ♂	20.3.07	...	Perth	K		v		v	v		
649	... ♀	19.3.07	...	do.	K	v	v		v	v	v	
650	... ♂	20.3.07	...	Northumberland	K	v	v		v	v		
651	... ♂	19.3.07	...	Perth	K	v	v		v			
652	... ♀	19.3.07	...	do.	K	v	v		v	v		
654	... ♀	20.3.07	...	Northumberland	K		v		v	v	v	
655	... ♂	18.3.07	...	Cumberland	Found dead	v	v			v	v	Accidental
656	... ♂	21.3.07	...	Yorks.	K							
657	... ♂	21.3.07	...	do.		v	v		v	v		
658	D ♂	28.3.07	22	Ross	Found dead	v		v	v	v	v	Worms
658a	... ♂	2.4.07	...	Inverness	K	v	v		v	v	v	
659	*											
660	H ♂	30.3.07	22½	Dumbarton	K	v					v	
661	H ♂	30.3.07	24½	Northumberland	K	v					v	
662	H ♀	30.3.07	21	do.	K	v						
663	H ♂	1.4.07	24	Kincardine	K	v					v	
664	... ♀	30.3.07	...	Caithness	K	v					v	
665	H ♀	30.3.07	23½	do.		v					v	
666	H ♂	1.4.07	23	Haddington	K	v						
667	H ♂	30.3.07	23½	Sutherland	K	v					v	
668	♂	30.3.07	...	do.	K							
669	♀	31.3.07	...	Dumbarton	Found dead		v		v	v		Worms
670		4.07	...				v		v	v	v	
671	♂	4.4.07	...	Yorks.	Found dead	v	v		v	v		Worms
672	♂	3.4.07	...	Selkirk			v		v	v	v	
673	♂	1.4.07	...	Argyll	Found dead	v	v		v	v		Worms

* Blackgame.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
675	♂	6.4.07	...	Moray	K	v			v	v		
676	♂	6.4.07	...	Peebles	Found dead	v	v			v	v	Accidental
677	♂	8.4.07	...	Cumberland	K						v	
678	♀	9.4.07	...	Yorks.	Found dead	v	v		v	v	v	Worms
679	♂	9.4.07	...	do.	K	v					v	
680	♂	8.4.07	...	Yorks.	K	v					v	
681	♂	10.4.07	...	do.	Found dead	v	v		v	v	v	Worms
682	♂		...				v		v	v		Accidental
683	♀	9.4.07	...	Perth	K	v						
684	♂	9.4.07	...	do.		v					v	
685	♂	10.4.07	...	Kirkcudbright	K	v					v	
686	♀	10.4.07	...	Wales	K	v						
687	*											
688	*											
689	†											
690	†											
691	♂	15.4.07	...	Kirkcudbright	Found dead	v		v	v	v		Worms
692	♂	15.4.07	...	Aberdeen	K	v						
693	♀	15.4.07	...	Yorks.	Found dead	v	v		v	v		Accidental
694	♂	16.4.07	...	do.	do.	v	v		v	v	v	Worms
695	♀	16.4.07	...	do.	do.	v	v		v	v	v	do.
696	♀	16.4.07	...	do.	Found dying	v	v		v	v		do.
697	♀	15.4.07	...	Dumbarton	Found dead	v	v		v	v		do.
698	♂	16.4.07	...	Yorks.	do.	v	v			v		do.
699	D ♀	17.4.07	11¼	do.	do.	v	v			v		do.
700	D ♀	17.4.07	12½	do.	do.	v	v			v		
701	D ♂	17.4.07	17	do.		v				v	Rush-heads and blaeberries	
702	D ♂	20.4.07	16¼	Perth	Found dead	v						
703	... ♂	20.4.07	...	Yorks.		v					v	
704	...	20.4.07	...	do.		v						
705	... ♂	20.4.07	...	do.		v						
706	... ♂	20.4.07	...	do.		v						
707	... ♂	22.4.07	...	do.		v						
708	♂	23.4.07	...	Perth	do.	v						
710	♂	22.4.07	...	Wales	K	v						
711	♂	22.4.07	...	Inverness	K	v						
712	♂	20.4.07	...	Northumberland	Found dead	v					*Calluna* tops and seed-heads: hairy rush-heads.	

* Ptarmigan.

† Blackgame.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
713	... ♂	20.4.07	...	Northumberland		v						
714	D ♂	23.4.07	18	Banff	Found dead	v						
715	D ♂	23.4.07	15	do.		v						
716	D ♂	22.4.07	16½	Sutherland	Found dead	v						
717	D ♂	25.4.07	17	do.	do.	v						
718	H ♂	29.4.07	22	Dumbarton	K	v						
719	♂	29.4.07	17½	Dumfries		v						
720	♀	29.4.07	15	do.		v	v				Blaeberry and rush-heads	
721	H ♂	27.4.07	25½	Arran	K	v						
722	H ♀	27.4.07	26½	do.	K	v					v	
723	... ♂	4.4.07	...	Perth	K	v						
724	H ♂	26.4.07	23	do.	K	v						
725	... ♂	27.4.07	...	do.	K							
726	H ♂	27.4.07	23½	do.	K	v						
728	... ♀	28.4.07	...	Forfar	Found dead	v						
729	... ♂	29.4.07	...	Moray	do.	v						
730	... ♂	29.4.07	...	Perth	do.	v					Moss seed capsules, rush-heads, *Calluna* tops, *Tormentilla* leaves	
731	... ♂	29.4.07	...	do.		v						
732	... ♂	30.4.07	...	Haddington	K	v						
733	... ♂	27.4.07	...	Perth	Found dead	v					v	
734	... ♂	28.4.07	...	Northumberland		v						
735	... ♀	1.5.07	...	Perth	do.	v					v	
737	... ♂	16.5.07	17	Wigtown			v		v	v		
738	... ♀	16.5.07	14	Perth								
739	.. ♂	16.5.07	20	do.								
740	... ♂	16.5.07	14	do.								
741	... ♀	16.5.07	17	do.								
742	D ♂	11.5.07	17	Aberdeen	do.							
743	I ♂	13.5.07	20½	Aberdeen	Found dying							
744	I ♂	24.5.07	17	Forfar	Found sick		v		v	v		
735	H ♂	26.5.07	23	do.	K		v		v	v		
746	D ♂	26.5.07	19	do.	Found dead		v					
747	D ♂	26.5.07	17	do.	do.		v		v	v		
748	D ♂	26.5.07	17	do.	do.				v	v		
749	D ♂	22.5.07	17¾	Inverness	do.							
750	I ♀	21.5.07	13¾	Selkirk	Found dying		v		v	v		

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
751	D ♂	22.5.07	18¼	Argyll	Found dead		v		v	v		
752	H ♀	22.5.07	23	Northumberland	do.				v	v		Collision
753	H ♀	22.5.07	24	do.	do.							Collision
754	D ♀	22.5.07	21	do.	do.		v		v	v		
755	D ♂	22.5.07	16¼	do.					v	v		
756	D ♂	22.5.07	17¾	do.			v		v	v		
757	H ♂	23.5.07	22¾	Perth	K				v	v		
758	... ♀	23.5.07		do.			v		v	v		
759	*											
760	... ♀			Dumbarton			v		v	v		
761	... juv.†	26.5.07		do.	Found dead							
761a	... juv.†	26.5.07		do.	do.							
761b	... juv.†	26.5.07		do.	do.							
761c	... juv.†	26.5.07		do.	do.							
761d	... juv.†	26.5.07		do.	do.							
762	... juv.	25.5.07		do.	do.							
900	D ♀	27.5.07	15½	Berwick	do.	v	p	o	p	p	o	Disease
901	H ♂	31.5.07	23	Dumbarton	K—shot	v	v	o	v	v	v	Healthy
902	D ♀	31.5.07	19½	Moray	Found dead	v	a	o	o	v a	v	Disease
903	*											
904	D ♀	1.6.07	13	Cumberland	do.	v	a	o	a	f	various	Disease
905	D ♂	1.6.07	13	do.	do.	...	v	o	v	v	...	do.
906	I ♀	4.6.07	20	Forfar	Sick	v	v	o	a	a	very full and mixed	Accident
907	D ♀	3.6.07	14½	do.	Found dead	v	v	o	v	v	...	Diseased and sitting
908	... ♂ juv.†	4.6.07	...	Forfar	do.	v	...	...	...	...	...	
909	...juv.†	4.6.07	...	do.	do.	v	...	...	...	...	...	
910	...juv.	4.6.07	...	do.	do.	Spirit	...	...	...	...	...	...
911	...juv.	4.6.07	.	do.	do.	do.	...	...	...	...	...	...
912	...juv.	4.6.07	...	do.	do.	do.	...	...	...	...	...	...
913	...juv.	4.6.07	...	do.	do.	do.	...	...	...	...	...	...
914	...juv.	4.6.07	...	do.	do.	do.	...	...	...	...	...	...
915	I ♂	74.6.0	16½	Forfar	Found dying – caught and hurt	v	v	v	o	v	Various	Disease
916	D ♀	4.6.07	17½	Moray	Found dead	v	v	o	v	v	*Calluna* and *Tetralix* tops	Disease
917	I ♀	3.6.07	15	Selkirk	Found dying —caught	...	a	o	a	a		Sitting and disease
918	H ♂	3.6.07	25	Inverness	K—shot	v	...	...	...	...	...	Healthy

* Hand reared.

† Blackgame.

No.	Sex.	Date.	Weight in ozs. (Av.)	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
919	I ♀	6.6.07	18	Yorks.	K—shot	v	...	...	...	...	...	Sitting—thin
920	♀	7.6.07	20	Moray	Found dead	v	f	o	f	f	...	Sitting—accidental
921	I ♂	7.6.07	17½	Perth	Found dying—caught	v	o	o	f	f	...	Disease
922	D ♂	6.6.07	19	Cumberland	Found dead	v	m	o	f	v	*Calluna* green shoots and insects	do.
923	D ♀	6.6.07	13	do.	do.	v	m	o	f	a	*Calluna*	do.
924	...juv.	9.6.07	...	Yorks.	do.	v	...	...	...	...	...	Weather
925	... ♀	14.6.07	...	Perth	Found dying—caught by dog		...	...	...	...	...	...
926	... ♂ juv.	14.6.07	...	Inverness	K	v	...	...	...	v	...	Healthy
927	H ♂	13.6.07	24	Wigtown	Found dead	v	...	...	a	f		Accident: neck broken—healthy
928	...juv.	14.6.07	...	Perth	do.	Spirit	...	...	...	...		
929	... ♀ juv. (24 days)	20.6.07	...	Argyll		v		...	...	...	*Calluna* and a few seeds	Healthy
930	... ♂ juv. (14-16 days)	20.6.07	...	do.		v		...	...	...		
931	*											
933	... ♀ juv. (10 days)	28.6.07	...	Dumbarton	Found dead	v	o	...	o	a number	Fresh green *Calluna* tips	
934	H ♂	28.6.07	25	Perth	K—shot	v		...	...	...		Healthy
935	H ♂	28.6.07	23	do.	do.	v	o	a	a	a		do.
936	D ♀	28.6.07	12	Roxburgh	Found dead		m	o	v	f		Disease
937	H ♂	28.6.07	26	do.	K—shot	v	m	o	f	f		Healthy
938	H ♂	28.6.07	21	do.	do.	v	some	p	a	f		do.
939	H ♂	28.6.07	20½	Ross	do.		f	o	f	f	*See* book	do.
940	H ♂	28.6.07	24	do.	do.	v	v	o	a	a		do.
941	H ♂	28.6.07	22	do.	Shot		...	...	...	...		do.
942	...juv.	29.6.07	...	Forfar	K		...	...	...	...		
943	...juv.	29.6.07	...	do.	K		...	...	...	...		
944	I ♀	29.6.07	16	Cumberland	Found dying—caught by dog	v	...	...	...	...		Disease
945	... ♂ juv.	28.6.07	6	Dumbarton	K		o		o	o		Healthy
946	H ♂	28.6.07	25	do.	K—shot	v	v	v	p	a		do.
947	...juv.	29.6.07	7½	Inverness	K	v	...	...	...	...		
948				do.								
949				do.								

* Ptarmigan.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample	Cause of death.
950	H ♂	29.6.07	24	Argyll	K—shot	v	v	o	a	large numbers		Incipient disease—healthy
951	...juv.		...	Inverness	Arrived living		...	...	...	...		
952	D ♂	1.7.07	22	Perth	Found dead	Rotten	o	o	v	a		Disease
953	... ♂	1.7.07	...	do.	do.		...	...	...	...		Not examined
954	I ♂	27.6.07	17	Sutherland	Found dying—caught	v	a	o	excessive	enormous numbers	Empty	Disease
955	H ♂	27.6.07	23½	do.	K—shot	v	a few	o	a few	m		Healthy
956	H ♂	28.6.07	25	Ross	do.	v	some	o	a	v		do.
957	I ♂	28.6.07	22	do.	do.	v	p	o	few	a		Incipient disease
958	H ♂	28.6.07	24	do.	do.	v	...	...	...	...		Healthy
959	*											
960	H ♂	1.7.07	23	Northumberland	Shot	v	o	o	v	v		Healthy
961	H ♂	1.7.07	24	Selkirk	do.	v	v	o	v	v		do.
962	H ♂	1.7.07	25	do.	do.	v	...	...	...	...		do.
963	I ♀	1.7.07	17	Perth	Found dying	v	m	o	f	f		Disease
964	H ♀	1.7.07	23	Northumberland	do. shot, suspicious	v	o	o	m	f		? Healthy
965	H ♂	1.7.07	24	do.	Found dying		a few	o	a few	a		? Healthy
966	H ♂	1.7.07	23	Yorks.	shot	v	...	...	...	...		Healthy
967	H ♂	1.7.07	23	do.	do.	v	...	...	...	...		do.
968	H ♂	1.7.07	27	Selkirk	do.		...	...	...	...		do.
969	...juv.	1.7.07	...	do.		v	...	...	...	...		...
970	I ♂	2.7.07	19	Perth	Found dying—shot, suspicious		v	o	f	a		Incipient disease
971	... ♂ juv.	2.7.07	...	Inverness	K—arrived living	v	about 1½ doz.	o	o	a few		...
972	I ♀	28.6.07	14	Westmoreland	Found dying—shot	v	o	o	a	a		Worms
973	H ♂	2.7.07	23	Perth	do.	v	...	...	...	...		Healthy
974	H ♂	2.7.07	22	do.	do.		...	...	...	...		do.
975	I ♂	30.6.07	16	Stirling	Found dying	v	some	o	heaps	a		Disease
976	D ♀	30.6.07	11½	Ayr	Found dead	v	a	o	a	a		Disease and worms
977	...juv. (just hatched)	30.6.07	$\frac{1}{6}$	do.	...		...	...	...	...		

* Blackgame.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
978	...juv. (just hatched)	30.6.07	⅙	Ayr	...		...	...	...	...		
979	...juv. (just hatched)	30.6.07	½	do.	...		...	...	...	...		
980	H ♂	30.6.07	21	Ross	Shot	v	a	o	m	f		Healthy
981	H ♂	30.6.07	21	do.	do.	v	...	...	...	...		do.
982	H ♂	30.6.07	22	do.	do.		a	o	v	a		do.
983	I ♀	30.6.07	20	Perth	Found dying	v	o	a few	m	excessive		Disease and worms
984	H ♂	30.6.07	24	do.	Shot	v	a	o	a	a		Damaged—healthy
985	H ♂	1.7.07	20	Yorks.	do.	v	v	o	o	a		Healthy
986	H ♂	1.7.07	23	Inverness	do.	v	...	...	...	...		do.
987	H ♂	1.7.07	24	Nairn	do.	v	...	...	...	...		do.
988	...juv.	1.7.07	5½	do.	K	v	...	...	...	...		
989	...juv.	1.7.07	4	do.	K		...	...	...	...		
990	H ♂	1.7.07	...	Inverness	Shot	v	over abundant	o	a	m		Healthy
991	...	1.7.07	...	do.	do.		...	...	...	...		...
992	I ♀	25.6.07	18	Derby	Found dying		...	...	f	f		Disease
993	I ♂	1.7.07	23	Selkirk	Shot		...	...	...	...		Healthy
994	I ♂	6.7.07	14½	Argyll.	Found dying		f	o	f	f	Empty	Disease
995	...juv.	7.07	...	Ayr	Found dead		...	...	...	...		...
996	I ♀	14.7.07	16	Argyll.	Found dying	v	v	o	m	v		Disease
997	D ♀	16.7.07	12½	Cumberland	Found dead	v	m	o	o	many	Empty	do.
998	I ♀	22.7.07	13½	Perth	Found dying	v	a few	o	v	a	Fresh green *Calluna* tops and cluster leaves	do.
999	... ♀ juv.	22.7.07	5½	Derbyshire			...	...	...	...		
1000a	D ♀	10.6.07	19½	Moray	Found dead	v	...	...	...	...	Insects	Disease
1000b	...juv. (3 weeks, hand-reared)	12.6.07		Argyll	K	v	v	v	v	...		
1001	... ♀	15.6.07	...	Argyll	Found dead		...	...	...	...		Not examined
1002	H ♂	19.6.07	23	do.	K—shot	v	several	o	good many	some	Fresh *Calluna* tops	Healthy
1003	I ♀	17.6.07	15½	Perth	Found dying	v	v. few	o	few	v	Green leaves	Disease

No.	Sex.	Date.	Weight in ozs. (Av.)	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1004	H ♂	24.6.07	22½	Perth	K—shot	v	one	o	f	some	Fresh *Calluna* tips	Healthy
1005	H ♂	24.6.07	22½	do.	do.	v	v	o	v	v		do.
1006	I ♀	21.6.07	17½	Wigtown	Found sick	v	few	o	f	v	Fresh *Calluna* tops	Disease
1007	I ♂	3.7.07	20½	Yorks.	Found dying	v	m	o	many	v	Insect and cranberry leaves	do.
1008	D ♀	1.7.07	16½	do.	Found dead	v	o	o	o	v	*Calluna* tops, cranberry leaves	Disease
1009	H ♀	2.6.07	21½	Arran	Shot	v	o	o	o	v	*Calluna* tops	Healthy
1010	H ♂	2.6.07	23½	do.	K—shot	v	...	...	...	...	do.	Not examined
1011	H ♂	1.7.07	23	Selkirk	K	v	o	o	many	v	Green *Calluna* tips, cranberry leaves and fern tops	
1012	... ♂	1.7.07	23½	Inverness	Shot		many	o	do.	v		
1013	H ♂	1.7.07	23	do.		v	good many		do.	v	*Calluna* tops and cranberry leaves	Healthy
1014	D ♀	3.7.07	15½	Perth	Found dead	v	fair number	o	packed	v	A few green leaves	Disease
1015	I ♀	10.7.07	71	Stirling	Found dying		many	o	a	v	Green *Calluna* tops	do.
1016	D ♀	8.7.07	15½	Yorks.	Found dead		...	...	...	...	Empty	Disease
1016a	... juv.	10.7.07	...	Perth	do.	Spirit	many	o	many	v	*Calluna* tips	Worm enteritis
1017	D ♀	16 7.07	13½	Forfar	...	v	few	o	o	v	Empty	Disease
1017a	D ♂	18.7.07	17	Yorks	Found dead		many	o	some	v	Berries, *Calluna*	do.
1018	I ♀	16.7.07	17	Argyll	Shot	v	f	o	few	many		Incipient disease
1018a	... ♂ juv.	18.7.07	15½	do.	do.		o	o	o	v		Healthy
1019	... ♀ juv.	26.7.07	14½	Kincardine	K—by dog	v	few	o	some	v		do.
1020	... ♂ juv.	29.7.07	15½	Sutherland	K—shot	v	o	o	a	v	*Calluna* and rushes	do.
1021	... ♂ juv.	29.7.07	13	do.	do.		o	o	many	v	*Calluna*	do.
1022	... ♀ juv.	30.7.07	18½	Dumbarton	K—shot	v	o	o	o	v	do.	Healthy
1023	... ♂ juv.	27.7.07	12½	Caithness	Found dying	v	v	o	o	v	*Calluna* and Blaeberry leaves	Disease
1024	I ♂	29.7.07	17	Yorks.	do.	v	f	o	f	v		do.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1025	I ♂	1.8.07	17	Dumbarton	Found dying	v	good many	o	many	many	*Calluna*	do.
1026	... ♀ juv.	7.8.07	16	Argyll	do.	v	f	o	o	v		Incipient disease
1027	I ♀	12.8.07	18½	Northumberland	K—shot		m	o	p	f	Blaeberry leaves, *Calluna* tops and rush-heads	Worms and enteritis
1027a	I ♀	19.9.07	15	Caithness	do.	v	o	o	o	v	*Calluna*	Disease
1028	I ♀	12.8.07	15¾	Northumberland	do.	v	a	o	a	v		do.
1028a	I ♂	21.9.07	18½	Lanarkshire	do.		some	o	many	v	Many caterpillars	do.
1029	I ♀	12.8.07	15½	Northumberland	do.		m	v	f	a		do.
1029a	D ♂	23.9 07	17	Yorks.	Found dead		o	o	many	v	*Calluna*	Cæcal enteritis
1030	D ♂	23.9.07	18½	do.	do.		o	o	do.	v		do.
1031	D ♂	21.9.07	15¼	do.	do.		o	o	o	v		do.
1032	I ♂	24.9.07	18½	Dumbarton	K—shot		o	o	one	v	*Calluna* and rush-heads	Incipient disease
1033	I ♀	24.9.07	19	Ross	do.		o	o	many	many	*Calluna*	Disease
1034	I ♂	24.9.07	20½	do.	do.		o	o	do.	do.	*Calluna* and insects	Incipient disease
1035	... ♀ juv.	24.9.07	15½	do.	do.		o	o	do.	v	*Calluna* and Cranberry leaves	Healthy
1036	I ♀	24.9.07	16½	do.	do.		o	o	good many	v	*Calluna*	Disease
1037	...	25.9.07	...	Arran								Destroyed
1038	H ♂	26.9.07	23½	Caithness	K		some	o	some	v	*Calluna*	Healthy
1039	I ♂	26.9.07	18	do.	K		o	o	good many	v	*Calluna* and insects	Disease
1040	H ♂	27.9.07	22	Ross	do.		o	o	few	many	*Calluna*	Healthy
1041	I ♂	27.9.07	19½	do.	do.		o	o	do.	v	*Calluna* and rush-heads	Incipient disease
1042	I ♂	27.9.07	19½	do.	do		o	o	many	v	*Calluna* and insects	do.
1043	D ♂	30.9.07	19½	Wigtown	Found dead		v	a few	v	many	*Calluna*	Cæcal enteritis
1044	I ♀	30.10.07	17	Kirkcudbright	Found dying		many	o	many	do.	do.	do.
1045	... ♀ juv.	3.10.07	13	Dumfries	Found sick		...	...	a	v	Empty	do.
1046	I ♂	7.10.07	19½	Perth	Found dying —shot		o	o	a	v	*Calluna* and insects	Incipient disease
1047	H ♀	10.10.07	21	Arran	K—shot		o	o	o	few	Empty	Healthy
1048	... ♀ juv.	10.10.07	13½	do.	do.		few	o	few	v. few	do.	Incipient disease
1054	... ♂	26.8.07	...	Yorks.		v						

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample	Cause of death.
1100	H ♂	31.7.07	26½	Arran	K—shot	v	m	o	f	f	A few rush-heads and green *Calluna* tops	Healthy
1101	I ♀	31.7.07	17½	do.	do.	v	o	o	v	f	*Calluna* tops	Incipient disease
1102	I ♂	31.7.07	16	do.	Found dying	v	m	o	v. a.	f	*Erica cinerea* flowers, green *Calluna* tops, rush-heads, and seeds	Disease
1103	I ♂	31.7.07	17½	Perth	do.	v	some	o	o	some	Green *Calluna* tops and Blaeberry leaves	do.
1104	I ♂	3.8.07	14½	Selkirk	do.	v	m	o	f	f	Empty	do.
1105	D ♂	3.8.07	17½	Perth	Found dead	v	o	o	v	v	v	do.
1106	*											
1107	I ♂	7.8.07	20	Oldham	Found dying	v	m	o	o	f	Blaeberry stem and leaves and rush-heads	Incipient disease—worms, kidneys, nephritis
1108	I ♂	8.8.07	19½	Inverness	do.	v	m	o	f	f	*E. cinerea*, *Tormentilla* seed heads, and many seeds	Disease
1109	I ♀	10.8.07	16½	Sutherland	Found dying—caught sick by dog	v	f	o	very full	f	Green *Calluna* tops	do.
1110	D ♂	9.8.07	14	Inverness	Found dead	v	f	o	f	f	v	Bad disease
1111	I ♀	12.8.07	19	Perth	K—shot, suspicious	v	some		f	f	Empty	Worms
1112	I ♂	12.8.07	19	Ayr	Shot, suspicious	v	m	o	crammed	v	do.	Bad worm enteritis
1113	D ♂	12.8.07	15¾	do.	Found dead	v	some	o	heaps	f	do.	do.
1114	I ♀	15.8.07	14	Perth	K—shot suspicious	v	do.	o	f	heaps of	*See* book	Disease
1115	I ♀	15.8.07	18	do.	do.		do.		v. many	many	Pennywort seed cases and chickweed	do.

*Pheasant.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin pre-served.	Hymenol.	Trichos.	D urogalli.	Strongyl.	Crop sample.	Cause of death.
1116	I ♀	15.8.07	16½	Perth	K—shot, suspicious		some	v. few	v	many	*Calluna* green tips, Blaeberry leaves	Disease
1117	I ♀	15.8.07	18	do.	do.		m	o	m	p	*Calluna* tops and flower buds	do.
1118	I ♀	16.8.07	15½	Argyll	K—suspicious		f	o	f	f	...	do.
1119	I ♂	16.8.07	19	do.	do.		m	o	f	f	Empty	Incipient disease
1120	I ♀	16.8.07	17½	do.	do.	v	f	o	f	many	Grass seeds, green *Calluna* tops	Cæcal inflammation
1121	... ♂ juv.	17.8.07	10	Durham	do.	v	m	o	o	f	*See* book	Worms, very thin
1122	I ♀	17.8.07	14¾	do.	Shot, suspicious		a	o	p	a	Rush seed heads, *E. tetralix* flowers	Disease
1123	I ♀	23.8.07	19½	Perth	K—shot, suspicious	v	o	f	some	f	*Calluna* green shoots	Disease
1124	I ♂	23.8.07	16	do.	do.		o	f	f	v	*Erica cinerea* flowers, rush-heads, etc.	do.
1125	I ♀	19.8.07	17	Inverness	K		v	o	v	v	...	Incipient disease
1126	I ♀	19.8.07	19	do.	K		o	o	a	a	...	do.
1127	I ♀	16.8.07	19	Ayr	K		a	o	...	p	Green *Calluna* shoots, *E. tetralix* flowers	do.
1128	H ♀	16.8.07	22	do.	K		v	o	v	v	Green *Calluna* shoots, *E. tetralix* flowers	Healthy
1129	I ♀	16.8.07	19	do.	K		a few	o	v	p	Green *Calluna* shoots, *E. tetralix*, and *E. cinerea* flowers	Incipient disease
1130	H ♀	16.8.07	22	do.	K		...	...	...	...	...	Healthy
1131	I ♀	17.8.07	16	Westmoreland	Found dying		v	v	v	v	Great mix up *See* book	Worms disease
1132	I ♂	16.8.07	16	Ayr	K—suspicious		m	o	f	f	*See* book	Worms disease

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1133	I ♀	16.8.07	17¼	Ayr	K—suspicious		many	a few	m	v	...	Very bad disease
1134	I ♀	16.8.07	14	do.	do.		m	o	f	f	Empty	Worms disease
1135	I ♂	15.8.07	19	Caithness	Found dying	v	m	o	m	f	*See* book	Disease
1136	I ♀	19.8.07	17	Inverness	K—shot, suspicious	v	m	o	v	v	...	Incipient disease
1137	I ♂	20.8.07	20	Ross	K—suspicious	v	m	o	f	m	*See* book	Worms—bad
1138	...juv.	20.8.07	10	do.	Found dead		...	...	...	...	Green *Calluna* shoots	Not examined—maggotty
1139	I ♂	19.8.07	19½	Dumbarton	K—shot, suspicious	v	f	o	a	v	Green *Calluna* shoots, Pennywort seed cases	Bad disease
1140	I ♂ juv.	19.8.07	15	Forfar	K—suspicious	v	o	large numbers	f	v	Green *Calluna* shoots	Disease
1141	I ♀	19.8.07	19	Argyll	K	v	m	o	a	f	...	Incipient disease
1142	I ♀	19.8.07	17	do.	K	v	a few	o	heaps	v	*Calluna* green shoots, rush-heads	Overnesting
1143	I ♀	20.8.07	16½	Banff	Shot	v	m	o	m	v. many	*See* book	Disease and overnesting
1144	I ♂	20.8.07	18½	Caithness	do.		m	o	a	p	Seeds and berries in gizzard	Very poor, incipient disease
1145	... ♀ juv.	21.8.07	8½	Perth	Picked up alive	v	many	o	f	f	Empty	...
1146	D ♀	15.8.07	13 approx.	Yorks.	Found dead		v. few	o	v. a.	v	...	Worms
1147	D ♂	15.8.07	14½	do	do.		...	o	v. a.	a	*Calluna* tops, rush-heads	Worms
1148	I ♀	23.8.07	19⅓	Perth	K—shot	v	v	o	a	v	...	Oversitting
1149	I ♀	23.8.07	17¼	do.	K—suspicious		m	o	m	p	...	do.
1150	... ♂	23.8.07	17½	do.	do.		v. few	o	some	v	*Calluna* tops and flowers	Not disease—old shot wound in abdomen
1151	I ♀	23.8.07	19	do.	do.	v	m	o	f	a	*Calluna* tops only	Incipient worms disease
1152	I ♀	23.8.07	19	do.	do.	v	v	o	v	v	*Calluna* tops and Blaeberry leaves	Incipient worms disease

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample	Cause of death.
1153	I ♀	21.8.07	14¼	Ross	K—suspicious		p	o	p	p		Disease—mild case worms
1154	... ♂ juv.	21.8.07	11½	do.	K—shot, suspicious		o	o	numerous	a		Mild case, worms
1154a	I ♂	28.8.07	17		Shot		a few		p	p		Incipient disease
1155	I ♀	23.8.07	15¼	Kirkcudbright	do.	v	...	...	...	...		Disease
1156	I ♂	23.8.07	15¾	do.	K—shot	v	a	o	a	v	*Calluna* flower buds, grass seeds, rush heads	Recovering cæcal enteritis
1157	... ♂ juv.	23.8.07	...	Yorks.	Found dead			a	p	v	Rush head, fern, *Calluna* tops, etc	Worms
1158	I ♀	23.8.07	19¼	Inverness	K—shot, suspicious	v	some	o	p	a	Empty	Incipient worms disease
1159	... ♂	20.8.07	22¾	Caithness	do.		v	o	v	v		Old pricked bird
1160	I ♀	24.8.07	14½	Sutherland	K—suspicious	v	v	o	v	v	*Calluna* leaves and flowers and one berry	Worms
1161	I ♂	24.8.07	21½	do.	do.	v	p	o	a	a	*See* book	Worms.
1162	I ♀	24.8.07	17½	do.	Found sick	v	m	o	a	v	Rush seed heads, *Calluna* tops	do.
1163	I ♀	24.8.07	16¼	do.	K—shot	v	a	o	a	a	*Calluna* flower buds and green tops	Oversitting and worms
1165	D ♀	26.8.07	14	Wigtown	Found dead	v	f	o	m	f	Green *Calluna* tops	Worms
1166	I ♀	25.8.07	16	Arran	K—shot, suspicious		v	o	a	v	*See* book	do.
1167	H ♂	24.8.07	24¼	Aberdeen	do.	v	v	o	f	f		Healthy
1168	I ♂	27.8.07	25	Yorks.	Found dying —shot		o	o	o	v	Crowberry and Blaeberry leaves	Bad worms disease
1169	I ♂	27.8.07	22	Sutherland	K—suspicious		m	o	v	v	Empty	Mild worms
1170	I ♀	27.8.07	18¼	do.	do.		o	o	v	v. a	*Calluna* tops and rush heads	Overset worms
1171	I ♀	24.8.07	18	Aberdeen	Found dying		a	o	a	a		Worms
1172	I ♀	24.8.07	17	do.	do.		v	o	p	a	Empty	do.
1173	I ♂	24.8.07	16¾	do.	do.		m	o	v	v. a	*See* book	Incipient worms disease
1174	I ♀	30.8.07	14½	Perth	do.	v	f	o	f	a	v	Disease
1175	I ♂	31.8.07	18	Caithness	K	v	a	o	m	v. a		do.

No.	Sex	Date.	Weight in ozs (Av.).	County.	Manner of death.	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1176	I ♂	31.8.07	18	Perth	K—shot		v	...	...	v		Incipient disease
1177	I ♂	3.9.07	19¼	Dumfries	K—shot, suspicious		o	o	v	heaps	Fern and rush seed heads	Encysted abscess and worms
1178	H ♀	3.9.07	25⅓	do.	K—shot		o	o	v. a	v		Healthy
1179	I ♂	4.9.07	19½	Perth	Found dying	v	a few	o	a	a		Worms
1180	H ♀	5.9.07	24	Inverness	K—shot		o	p	p	a		Healthy
1181	H ♂	5.9.07	24	do.	K		o	o	v	v		do.
1182	I ♀	6.9.07	17	Yorks.	K—shot, suspicious	v	m	o	a	m	Empty	Worms
1183	I ♂	6.9.07	20½	do.	do.	v	m	o	m	p	*Calluna* green tops	Incipient worms disease
1186	I ♀	6.9.07	17	Forfar	do.	v	o	o	p	p	Rush heads and *Calluna* flower	Incipient cæcal enteritis
1187	I ♂	6.9.07	17	do.	do.	v	a	o	a	a		do.
1188	H ♂	9.9.07	24	Dumbarton	K—shot	v	...	...	...	...		Healthy
1189	H ♂	10.9.07	22	Arran	K	v	very few	o	f	a		do.
1190	H ♂	10.9.07	24½	do.	K	v	a few	o	f	f	*Calluna* tops and flower	do.
1191	... ♂	10.9.07	23½	Westmorland	Found dying—caught	v	v	o	f	a		? Pricked bird —worms
1192	D ♀	10.9.07	14½	Caithness	Found dead	v	m	o	a	a	*Calluna* tops and flowers and *Erica cinerea* flower	Cæcal enteritis
1193	I ♀	10.9.07	18	Sutherland	K—shot	v	v	o	a	p	*Calluna* tops and flower. Potentilla seed heads	Overset and mild worms
1200	I ♂	9.10.07	21½	Roxburgh	Found dying—K, with stick	v	v	o	crowded	p	Only oats	Worms
1201	I ♀	9.10.07	16	Yorks.	K—shot, suspicious	v	p	o	v	f	20 or 30 black Crowberries	Cæcal enteritis
1202	I...	9.10.07	17½	do.	do.		...	...	...	...		Not examined —maggotty
1203	I...	9.10.07	18	do.	do.		...	...	...	...	...	do.
1204	... ♂ juv.	9.10.07	10½	do.	K—suspicious		m	o	o	a	*Calluna*, Blaeberry and some insects	Cæcal enteritis
1205	I ♀	7.10.07	13	do.	Found dying	v	m		v	heaps	Empty	Worms

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1206- 1207*												
1208	D ♂	8.10.07	16	Caithness	Found dead	v	p	o	v. a	v	Full of *Calluna* tops and Blaeberry	Cæcal enteritis
1209	D ♂	11.10.07	15	Perth	do.	v	...	...	o	v		Worms
1210	...	10.10.07	16½	Caithness	do.		...	...	...	...		Not examined —maggotty
1211	D ♂	12.10.07	21	Ross	do.	v	o	o	f	heaps	Mainly *Calluna* green tops	Bad cæcal enteritis
1212	I ♀	13.10.07	18	do.	K—shot, sick	v	m		m	v. a	v	Worms
1213	I ♀	15.10.07	16	Aberdeen	Found sick	v	...	...	crammed	v	Empty	do.
1214	I ♂	15.10.07	14	do.	do.	v	o	o	m	v	¼-full red Clusterberries. *See* book	do.
1215	I ♀	16.10.07	16	Perth	K—sick	v	one or two	o	v. a	v. a	*See* book	Recovering from cæcal enteritis
1216*												
1217	H ♀	17.10.07	22	Ireland (Co. Donegal)	K—shot	v	...	...	m	a	Empty	Healthy
1218	H ♂	17.10.07	25½	do.	K	v	...	...	m	a few	Full of *Calluna* tops and seed heads	
1219	D ♂	15.10.07	21	Argyll	Found dead		f	o	a few	v	*Calluna* green tops, some Ranunculus seed heads	Enteritis
1220	I ♀	19.10.07	15	Perth	K—shot, suspicious		o	o	crammed full	v	Empty	Cæcal enteritis
1221	I ♀	22.10.07	16	Yorks.	Found dying	v	o	o	several	v	*Calluna* seed heads and green tops	do.
1222	D ♀	22.10.07	11½	do.	Found dead	v	small mass	o	crammed	v	Empty	do.
1223	I ♂	23.10.07	18	do.	Found dying	v	o	o	a	p	Green *Calluna* tops and rush heads	do.
1224	I ♀	23.10.07	15½	do.	do.	v	m	v	a few	a	⅙-full green *Calluna* tops Blaeberry, rush heads	do.

* Blackgame.

No.	Sex.	Date	Weight in ozs. (Av.).	County.	Manner of death	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1225	I ♀	23.10.07	17½	Argyll	K—suspicious	v	m	o	a few	v	*Calluna* green tops, flowers and some woody buds	Mild cæcal enteritis
1226	I ♀	29.10.07	19	Berwick	K—shot, suspicious	v	a few	o	v	v	Few bits green *Calluna* tops	Fairly healthy
1227	I ♀	29.10.07	18½	Argyll	Found sick—shot		a few	o	v. a	v	...	do.
1228	I ♀	31.10.07	13	Derby	Found sick—caught	v	some	o	o	v. a	Empty	Enteritis
1229	I ♂	30.10.07	21	Kirkcudbright	Found dead—shot	v	...	...	m	v	Green *Calluna* tops and some insects	Cæcal enteritis
1230	I ♀	30.10.07	15	do.	do.	v	a few pieces	o	p	v	...	do.
1231	I ♂	30.10.07	17½	do.	do.	v	o	o	p	v	Bright green *Calluna* shoots and seed heads	do.
1232-1236*												
1237	H ♂	4.11.07	23	Roxburgh	K	v	some bits	o	f	v. a	½-full *Calluna* green tops, flower seed heads and Blaeberry shoots	do.
1238	I ♀	3.11.07	17	do.	Found dying—caught	v	o	o	crammed	a	v	do.
1239†												
1240	I ♀	6.11.07	18	Durham	K—sick	v	...	...	...	...	⅓-full green *Calluna* tops and flower seeds	Too shattered to examine
1241	I ♀	6.11.07	18½	do.	K—found sick		broken up	o	p	excessive	Empty	Cæcal enteritis
1242	I ♂	6.11.07	18	do.	do.	rotten	...		...	...	Enormously full *Calluna* green tops, etc. *See* book	do.
1243	I ♂	6.11.07	21	do.	do.	v	o	o	a few	a	*Calluna* green tops and flower seed heads	do.
1244	... ♀ juv.	25.10.07	19½	Dumbarton	Found dead	maggoty	...		...	...	...	Accidental

* Blackgame.

† Blackgame (Albino).

No.	Sex	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1245	I ♀	31.10.07	18½	Dumbarton	K—shot, suspicious		o	o	p	some	v	Fairly healthy
1246	D ♂	8.11.07	15½	Yorks.	Found dead		o	o	o	v	Empty	Bad cæcal enteritis
1247	D ♀	12.11.07	12½	Ayr	do.	v	o	o	a	v	Empty	Cæcal enteritis
1248	D ♀	21.11.07	13½	do.	do	v			large, ripe	a	*See* book. Corn husks, etc.	Doubtful enteritis
1249	D ♀	18.11.07	13½	Yorks.	do.		o	o	one	m	Green *Calluna* tops and seeds, Blaeberry heads and leaves	Cæcal enteritis
1250	D ♂	18.11.07	16½	do.	Found dead—very poor condition	v	o	o	o	p		Cæcal enteritis—starvation
1251	I ♀	7.12.07	15½	Ayr	K—suspicious	v	o	o	f	p	Rotten corn sorrel leaves	? Doubtful
1252	I ♂	7.12.07	19¾	Roxburgh	K—shot suspicious	v	o	o	m	p	Green *Calluna* and seed tops	Cæcal enteritis slight
1253	I ♂	3.12.07	17½	Argyll	Found dying—picked up by dog	v	o	o	m	v		Cæcal enteritis
1254	...	2.12.07	...	Perth			small quantity	o	v	v. a		
1255	...	2.12.07	...	do.			a few		v	very many		
1256	H ♂	7.12.07	...	Dumbarton	K		o	o	v	v	v	Healthy
1257	I ♂	12.12.07	20½	Ayr	No letter	v	o	o	o	heaps	v	Commencing cæcal enteritis
1258	H ♂	19.12.07	25	Inverness	K	v	o	o	a few	m	Brown and green *Calluna* tops and seeds	Healthy
1259	I ♂	20.12.07	19	Yorks.	K—sick; killed with a stick	v	...	...	v	enormously abundant		Cobbold's Strongylosis
1260	I ♂	3.1.08	19	Argyll	Found dead		o	o	f	v	Empty	Worms in a badly-pricked bird
1261	I ♂	24.1.08	19	do.	K—shot, suspicious		...	v	f	v	v	Cobbold's Strongylosis
1262	... ♂	20.1.08	19	do.	Found dead	v	very few	o	a	p	Green *Calluna*	Rare form of lung disease

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Tricbos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1263	D ♀	1.08	17½	Caithness	Found dead	v	o	o	one	v		Cobbold's Strongylosis
1264	H ♀	24.1.08	21	Westmorland	K—shot		o	o	o	v	v	
1265	D ♀	27.1.08	15	Perth	Found dead	v	...	a	o	v	Empty	Enteritis
1266	H ♀	30.1.08	22½	Dumbarton	K—shot		o	o	p	v	A little good dark-green winter *Calluna*	Intussusception
1267	H ♂	30.1.08	26½	Argyll	do.		o	o	v	p	Full	Healthy
1268	H ♂	4.2.08	21½	Inverness	do.	v	...	...	...	...	v	do.
1269	D ♀ ad.	4.2.08	13	Derby	Found dead		o	o	very large	v a	Very little Blaeberry stalks and buds	Worms—insufficient
1270	H ♂	10.2.08	24½	Inverness	K—shot	v	...	...	...	...	...	Healthy
1271	H ♂	6.2.08	27	do.	do.		...	...	...	...	Very full	do.
1272	H ♂	6.2.08	20	do.	do.		...	...	...	...	...	do.
1273	H ♂	23.1.08	22	Sutherland	do.		...	...	...	...	...	do.
1274	H ♂	7.2.08	26	do.	do.	v	o	o	f	p	...	do.
1275	H ♂	7.2.08	23	do.	do.		...	...	...	...	...	do.
1276	... ♂	13.2.08	21	Inverness	K—shot, suspicious	v	o	o	...	...	...	"pricked" bird
1277	H ♂	17.2.08	19	Argyll	K—suspicious		...	a few	very full	v a	Small amount good green *Calluna* tops	Worms
1278	H ♂	17.2.08	25	Inverness	K—shot	v	o	o	a	a	Full mainly *Calluna* tops	
1279	H ♂	17.2.08	23	do.	Found dead	v	o	o	f	heaps	...	Damage to heart
1280	H ♂	18.2.08	24	Argyll	K, by fence	v	o	o	p	p	Full *Calluna* tops—green and winter	
1281	H ♂	23.2.08	23	Banff	K		o	o	v	f	Empty	
1282	D ♂	20.2.08	17	Sutherland	Found dead		...	...	...	...		Too rotten to examine
1283	D ♂	24.2.08	21	Durham	do.		o	o	o	p	Empty	Worms
1284	H ♂	22.2.08	21	Moray	K—shot		...	...	...	...		Healthy
1285	H ♂	24.2.08	26	Dumbarton	K, by rabbit wire		...	...	...	...		do.
1286	H ♀	27.2.08	22	Wales	K—shot	v	...	...	...	...	Few scraps of Blaeberry stalk and bud —*Calluna* tops	do.
1287	H ♂	27.2.08	25	Wales	K—shot	v	...	...	...	...	Full. *See* book	Healthy

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1288	H ♂	25.2.08	25	Inverness	K—shot	v	...	...	...	...	Full Blaeberry and *Calluna*	Healthy
1289	I ♂	25.2.08	18	Argyll	Found sick—caught	v	a few	a few	a	normal cæca	o	Accidental and sick
1290	H ♂	17.2.08	24	Westmorland	K—shot	very backward much yellow fat	o	o	v	v	Green and brown *Calluna* tops	Healthy, fat
1291*												
1292	I ♀	6.3.08	18	Yorks.	Found dying—caught	v	o	o	o	v	v	Disease of kidneys
1293	D ♀	12.3.08	16½	Lancaster	Found dead		...	...	...	...	...	Disease—too rotten to examine
1294	D ♂	12.3.08	18	do.	do.	v	a	o	o	v	o	Worms
1295	D ♀	14.3.08	14	Ayr	do.	v	o	o	some	f	v	do.
1296	H ♂	13.3.08	21	do.	K—sick ; shot	v	o	o	p	p	Enormous	Wound—from barbed wire
1297	I ♀	15.3.08	14	Kincardine	Found sick—killed by dog	v	p	o	p	p	v	Worms and cæcal enteritis
1298	D ♀	19.3.08	14	Lancaster	Found dead	v	o	o	o	f	v	do.
1299	D ♂	18.3.08	19	Yorks.	do.		p	o	o	v	...	Old worm trouble
1300	... ♂	10.3.08	22	Surrey (Frimley)	K—by chloroform	v					v	Healthy
1301	H ♀	19.3.08	22	Banff	K—shot	a good deal of fat	p	o	...	p	v	Healthy, fat
1302	H ♂	23.3.08	27	Inverness	do.	v	...	...	...	...	v	Healthy
1303	H ♂	20.3.08	22	Westmorland	do.	v	o	o	some	many	v	do.
1304	I ♂	23.3.08	18	Selkirk	Found dying—caught	v	a few	o	f	f	v	Wounded, also worms and cæcal enteritis
1305	I ♀	23.3.08	13	Sutherland	Found dying—caught near water	v	...	...	m	very large numbers	Empty	Cæcal enteritis
1306	I ♀	26.3.08	19	Ayr	Found sick—shot	v	o	o	o	p	Excessively full	Worms, very poor condition
1307	H ♂	24.3.08	21	Moray	K—shot	v	...	...	...	...	...	Healthy

* Greyhen

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1308	H ♂	23.3.08	22	Wales	K—shot	v	...	...	...	...	...	Healthy
1309	H ♂	23.3.08	21	do.	do.		...	...	...	...	...	do.
1310*												
1311	♀	30.3.08	16¼	Perth	Found dead	v	o	o	crammed	p	Woody *Calluna*	Obstruction at proventriculus
1312	H ♂	31.3.08	21¼	Dumbarton	K—shot	v	p	o	present	p	Green *Calluna* tops	Healthy
1313	H ♀	31.3.08	24¼	Arran	do.	v	m	o	v	v	o	do.
1314	H ♂	31.3.08	22¾	do.	do.	v	m	o	v	p		do.
1315	♀	30.3.08	16	Surrey (Frimley)	K—by cock			v				
1316	D ♀	2.4.08	16½	Sutherland	Found dead	v	v	v	v	m	Green *Calluna* tops	Bad case cæcal enteritis
1317	♂	30.3.08	14	Surrey (Frimley)	K—by cock			v		v		
1318	D ♀	4.4.08	19	Yorks.	Found dead	v	o	o	v	m	Very mixed	Cæcal enteritis
1319	... ♂	6.4.08	20	Banff	do.	v				v		Poison—hand-reared
1320	D ♀	6.4.08	12½	Sutherland	do.	v	m	o	a	heaps		Cæcal enteritis
1321	H ♂	6.4.08	24	Caithness	K—shot	v	m	o	v	p	v	Healthy
1322	D ♂	6.4.08	16	do.	Found dead	v	good many	o	a	m	v	Bad cæcal enteritis
1323	D ♀	6.4.08	15	do.	do.	v	some	o	a few	many	v	Cæcal enteritis
1324	H ♂	17.3.08	23½	Banff	K—shot	v	...	...	...	...		Healthy
	... ♂	6.4.08	...	Caithness	Found dead		...	...	...	...		Too rotten to examine
1325 } 1326† }												
1327	D ♂	10.4.08	18	Sutherland	do.		m	o	heaps	v	Empty	Cæcal parasitism
1328	D ♂	11.4.08	18	do.	do.		p	o	m	m	v	Strongylosis
1329	D ♂	11.4.08	15½	do.	do.		o	o	m	m	Rush-heads	do.
1330	D ♂	11.4.08	17	do.	do.		v	o	v	m	Mixed	do.
1331	D ♀	11.4.08	16	do.	do.		o	o	a few	p		do.
1332	D ♂	11.4.08	19	do.	do.	v	...	...	...	...		Disease
1333	D ♂	11.4.08	16	do.	do.		m	o	m	v		do.
1334	D ♂	13.4.08	18	do.	do.	v	...	...	...	...		do.
1335	D ♀	13.4.08	16	do.	do.	v	...	...	...	...	*Calluna* tops, hairy rush-heads	do.
1336	D...	13.4.08	15½	do.	do.	v	...	...	...	...	v	do.
1337	D ♂	13.4.08	20	do.	do.	v	m	o	absolute masses	m excessive		do.
1338	D ♂	13.4.08	20	do.	do.	v	...	...	...	...		do.

* Blackgame. † Blackcock.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1339	D ♀	15.4.08	17	Lancaster	do.	v	o	o	o	v	Blaeberry	Worm enteritis
1340	D ♂	15.4.08	19	Sutherland	do.	v	o	o	v	m	v	do.
1341	D ♂	13.4.08	22	Inverness	Found sick—caught by dog		m	o	m	m	v	Incipient worm enteritis
1342	D ♂	12.4.08	16¾	Caithness	Found dead	v	m	o	m	mass		Worm enteritis
1343	D ♂	13.4.08	19	Moray	do.	v	o	o	m	m	v	do.
1344	D ♂	13.4.08	18¾	Caithness	do.	v	m	o	m	m		do.
1345	D ♂	13.4.08	20	do.	do.	v	m	o	m	m	v	do.
1346	D ♂	15.4.08	16½	Lancaster	do.	v	...	...	...	...	Blaeberry	do.
1347	D ♂	16.4.08	21½	Caithness	do.	v	m	o	m	p	v	Worm disease
1348	D ♂	14.4.08	19½	do.	do.	v	a few	o	p	v	Green *Calluna*, Blaeberry	Worms
1349	H ♂	13.4.08	22¼	Westmorland	K—shot		...	...	...	...		Healthy
1350	D ♂	16.4.08	18½	Caithness	Found dead		one or two	o	crammed	f		Bad worms
1351	D ♂	17.4.08	18½	do.	do.		a good many	o	m	a		Disease
1352	D ♂	20.4.08	20	Lancaster	do.	v	m	...	...	v	v	do.
1353	D ♂	20.4.08	18	Sutherland	do.		quantity	v	o	m		do.
1354	D ♂	20.4.08	17½	do.	do.	v	v	o	m	m		do.
1355	D ♂	21.4.08	16½	Ross	do.		v	o	v	m	v	Bad worms
1356	D ♀	18.4.08	17½	Caithness	do.		o	v	v	v		do.
1357	H ♂	20.4.08	27	Moray	K—shot		v	o	v	v	v	Healthy
1358	D ♂	21.4.08	15¾	Caithness	Found dead		v	o	v	v		Bad worms
1359	D ♂	21.4.08	14	do.	do.	v	o	o	excess	excess		do.
1360	D ♂	22.4.08	16	do.	do.	v	a few	o	m	m	Green *Calluna* tops	do.
1361	D ♂	22.4.08	16¾	do.	do.	v	...	...	...	a		do.
1362	D ♂	22.4.08	15½	do.	do.	v	some	o	v	v		do.
1363	I ♂	22.4.08	19	do.	K by stick or dog—foundsick		a	o	a	a		Incipient worm enteritis
1364	D ♂	22.4.08	18¼	do.	Found dead		m	o	m	a	Dark green *Calluna*	Worm enteritis
1365	D ♀	23.4.08	13	Sutherland	do.		m	o	m	m		Cæcal enteritis
1366	D ♀	27.4.08	16½	Ross	Found dying—caught		m	o	m	large numbers		Disease
1367	D ♀	27.4.08	15¼	do.	Found dying—caught by dog	v	m	o	m	v	Good green *Calluna*	Cæcal enteritis
1368	D ♂	27.4.08	19	do.	K—suspicious, shot		m	o	m	m		Bad cæcal enteritis
1369	D ♂	27.4.08	17¼	do.	Found dead	v	crammed		m	v		Bad cæcal enteritis

No.	Sex.	Date	Weight in ozs. (Av.)	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1370*												
1371	D ♂	28.4.08	15½	Inverness	Found dead		crammed		m	v		Worms.
1372	D ♂	28.4.08	17½	do.	do.		o	o	m	v		do.
1373	I ♀	27.4.08	16	Yorks.	Found dying—shot	v	a		m	v		Worm enteritis
1374	D ♂	28.4.08	15½	Peebles	Found dead	v	v	o	o	v		Very bad cæcal and intermittent enteritis
1375	D ♂	27.4.08	17½	Aberdeen	do.	v	m	o	m	v		Very bad cæcal enteritis
1376	D ♀	29.4.08	18½	Elgin and Moray	do.	v	m	o	excessive	v		Very bad worms
1377	D ♂	24.4.08	17¾	do.	do.	v	v	o	v	m	v	Bad worms
1378	D ♂	25.4.08	21½	do.	do.		m	o	v. a	v	v	Bad cæcal enteritis
1379	D ♂	27.4.08	21½	do.	do.	v	v	o	v	v	v	Very bad cæcal enteritis
1380	I ♂	28.4.08	21½	Inverness	K—shot, suspicious		m	o	p	m	Tormentilla, *Calluna* tops	Incipient worm enteritis
1381	D ♂	28.4.08	18	Banff	Found dead		m	o	v	v		Worm enteritis
1382	D ♂	28.4.08	17	do.	do.	v	m	o	m	m	Very mixed	do.
1383	D ♀	28.4.08	17	do.	do.		v	o	v	v		do.
1384	I ♀	30.4.08	18½	Inverness	Found dying—caught		m	o	m	v		
1385	I ♂	30.4.08	21¾	Elgin and Moray	Found dead		m	o	m	v	v	Neck broken—worms—bad enteritis
1386	D ♂	29.4.08	20	Inverness	do.	v	m	o	some	m	Crowberry tips and Blaeberry leaves	Bad worms—enteritis
1387	I ♂	23.4.08	18	Sutherland	Found dying—caught		m	o	v. few	excessive	Empty	Some disease—used for bacterial purposes
1388	I ♂	1.5.08	16½	Lancaster	Found dying—caught, quite lively		p	o	p	v	...	? Worms—seems healthy
1389	I ♀	29.4.08	14½	Caithness	Found dying—caught	v	m	o	a good many	v	v	Probably half starved—killed by weather

* Blackgame

No.	Sex	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1390	I ♀	30.4.08	13½	Ross	Found dying—caught by dog	v	v	o	some	v		Starvation
1391	D ♂	2.5.08	15	Dumbarton	Found dead	v	o	o	many	m	...	Very bad cæcal enteritis
1392	H ♂	2.5.08	23	do.	K—shot	v	o	o	m	p	*Calluna* tops	Healthy
1393	D ♂	30.4.08	20	Inverness	Found dead		m	o	o	v	...	Disease
1394	D ♂	4.5.08	16½	Inverness	Found dead		o	o	a	v	...	Disease
1395	I ♂	5.5.08	16	Elgin and Moray	Found dying—caught and died		a	o	o	a	...	do.
1396	I ♂	5.5.08	16	Sutherland	Found dying—caught		f	o	a	v	...	Very bad cæcal enteritis—used for bacterial purposes
1397	H ♀	5.5.08	26	Elgin and Moray	Found dead		...	...	...	v	*Calluna* tops	Healthy collision with fence
1398	I ♂	4.5.08	17½	Yorks.	Found dying—caught		...	...	...	...	o	...
1399	D ♂	5.5.08	14	Elgin and Moray	Found dead		m	o	m	v	o	Disease—used for bacterial purposes
1400	I ♂	4.5.08	16	Sutherland	Found dying—caught		a few	o	large numbers	p	o	Very little cæcal redness—? starvation
1401	I ♂	6.5.08	20	Ross	Found dying—caught by dog		crammed	o	m	enormous numbers	o	Incipient disease
1402	♂*	6.5.08	15½	Surrey (Frimley)	Died in captivity	v	o	o	o			
1403	H ♂	5.5.08	22	Ross	Found dying—caught alive		...	...	...	...	...	Healthy
1404	I ♂	5.5.08	18	do.	Found dying—caught		m	o	v	m	...	Worms disease
1405	I ♂	5.5.08	16	Sutherland	Found dying	v	m	o	m	v	...	Cæca slightly red
1406	D ♂	5.5.08	18	Selkirk	Found dead—very thin	rotten	...		...	...	...	Rotten—disease
1407	I ♂	1.5.08	17	Inverness	K—shot, suspicious		m	o	v	v	v	Worms—slight disease
1408	D ♀	1.5.08	15½	do.	Found dead		v	o	o	v		Disease—cæca very red

* Hand reared

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1409	D ♂	5.5.08	18	Caithness	Found dead		m	o	m	v		Disease—slight reddening.
1410	I ♂	4.5.08	20	Inverness	Found dead—thin		...	...	...	...		...
1411	D ♂	4.5.08	15	do.	Found dead	v	m	o	m	v		Disease—some redness in cæca
1412	D ♂	4.5.08	17½	do.	do.		...	...	...	...	v	Worm piner
1413	I ♂	4.5.08	22	Inverness	K—shot, suspicious		v	o	excessive	v	v	Incipient disease—redness lower end cæca
1414	I ♂	4.5.08	21½	do.	K—shot		m	o	m	v		Incipient disease—very slight redness in cæca
1415	D ♀	4.5.08	14	Sutherland	Found dead		v	o	v	v		Disease—bad cæcal redness
1416	I ♂	4.5.08	20½	do.	do.	rotten	...		...	...		Rotten
1417	D ♂	4.5.08	17½	do.	do.		v	o	v	v		Redness of cæca marked
1418	D ♂	4.5.08	17½	do.	do.		m	o	v	v	v	Disease—redness, of cæca marked
1419	D ♂	4.5.08	19	do.	do.		v	o	...	v		do.
1420	D ♂	4.5.08	17	do.	do.		v	o	v	v		do.
1421	I ♂	4.5.08	12½	do.	Found dying—caught		m	o	m	v		do.
1422	I ♂	4.5.08	18½	Yorks.	do.		m	o	m	v		Disease—cæcal redness
1423	I ♂	4.5.08	17	do.	do.		v	o	v	v		Disease
1424	I ♀	5.5.08	14½	Inverness	K—suspicious	v	o	o	v	v		do.
1425	I ♂	5.5.08	17½	do.	K—shot, suspicious		o	o	v	v		Disease—cæca very red
1426	H ♂	4.5.08	23½	do.	K—shot		crammed	o	crammed	p		Healthy—no redness at all—used for bacterial purposes
1427	D ♂	4.5.08	20	do.	Found dead		o	o	v	v		Disease—cæca very red
1428	I ♂	4.5.08	18	Yorks.	Found dying—caught		m	o	excessive	v		Worms—bad

No	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1429	D ♂	5 5.08	16	Banff	Found dead		v	o	v	v	Empty	Disease—bad cæcal reddening
1430	D ♂	5.5.08	16½	do.	Found dead—very thin		...	...	...	...	do.	Disease
1431	D ♂	5.5.08	20	do.	Found dead		...	...	...	...	Full—good green *Calluna*	do.
1432	D ♂	5.5.08	19	do.	do.		v	o	v	v	...	Disease—not much redness
1433	D ♀	24.4.08	19	Aberdeen	Found dead		a	o	a	v	Empty	Disease—bad cæcal redness
1434	D ♂	24.4.08	17	do.	do.		v	o	v	v	do.	do.
1435	D ♀	24.4.08	19	do.	do.		a	o	a	v	Full Cranberry leaves and *Calluna* tops	do.
1436	D ♂	24.4.08	19½	do.	do.		v	o	v	v	Empty	do.
1437	D ♂	24.4.08	16½	do.	do.		v	o	v	v	do.	do.
1438	D ♂	24.4.08	18	do.	do.		...	...	...	...	do.	do.
1439	H ♂	4.5.08	22½	Selkirk	Found dead—killed by wire		m	o	v	v	v	Incipient disease—killed by wire
1440	D ♀	4.5.08	22	do.	Found dead	v	m	o	m	v	v	Villi red—worm enteritis
1441	*											
1442	*											
1443	D ♂	5.5.08	19	Inverness	do.		a	o	a	v	*Calluna* tops and *Tetralix* tops	Disease
1444	D ♀	5.5.08	15	do.	do.		...	...	...	...	...	do.
1445	D ♂	5.5.08	15	do.	do.		...	...	...	...	...	do.
1446	I ♂	5.5.08	20½	do.	Found dying—shot		...	...	...	...	v	...
1447	I ♂	5.5.08	17½	do.	do.		m		v	v	A few bits green *Calluna*	Incipient disease
1448	D ♂	5.5.08	18½	Elgin and Moray	Found dead							Worm enteritis
1449	D ♂	5.5.08	19	do.	do.		...	...	...	...	...	do.
1450	D ♂	5.5.08	18½	do.	Found dead—very thin							
1451	D ♀	5.5.08	15½	do.	Found dead—thin		...	...	...	...		Worm enteritis

* Blackcock.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1452	D ♂	5.5.08	20	Elgin and Moray	Found dead—thin		...	...	...	...	Good green *Calluna* tops	Worm enteritis
1453	D ♂	5.5.08	17	do.	do.		...	...	...	...		do.
1454	I ♀	5.5.08	18½	do.	Found dying—thin		...	...	...	...		do.
1455	I ♀	5.5.08	18½	do.	Found dead—thin	v	v	o	v	v		do.
1456	I ♂	5.5.08	19	do.	Found dying—thin	v	v	o	v	v	v	Egg broken inside—slight disease
1457	D ♀	4.5.08	16	Sutherland	Found dead		...	...	...	...		Disease
1458	D ♀	4.5.08	15	Elgin and Moray	do.		...	...	...	...		Worm enteritis
1459	... ♂	4.5.08	...	do.	do.		...	...	...	...		
1460	H ♂	6.5.08	24	Inverness	K—shot		...	...	...	v		No red villi—healthy
1461	H ♂	6.5.08	24	do.	do.		one or two	o	v a	v		do.
1462	I ♂	4.5.08	20	Caithness	Found dying—caught	v	m	o	m	m		Disease—worm enteritis
1463	I ♀	2.5.08	15	Sutherland	do.	v	v	o	v	v		Disease—cæcal redness marked
1464	I ♀	6.5.08	14	do.	do.	v	v	o	v	v		Disease—worm enteritis
1465	D ♂	5.5.08	18	Yorks.	Found dead		m	o	v	v	Various	do.
1466	D ♂	5.5.08	17½	Ayr	do.		v	o	v	v		Disease
1467	D ♀	5.5.08	17	do.	do.	rotten			...	...	v	Disease—rotten
1468	D ♂	5.5.08	19	do.	do.		m	o	m	v		Worm enteritis—bad
1469	D ♂	5.5.08	18	do.	do.	rotten	...	...	...	...		Disease—rotten
1470	I ♂	6.5.08	16	Elgin and Moray	Found dying—caught		p	o	m	p		Worm enteritis
1471	D ♂	4.5.08	16	Ross	Found dead		...	...	...	...	Empty	Disease—cæca very red
1472	D ♂	4.5.08	21	do.	do.		...	...	...	...	Empty	do.
1473	I ♂	5.5.08	20	do.	K—shot, suspicious		m	o	m	v	Green fresh *Calluna* and Blaeberry	Incipient disease—very little redness in cæca
1474	I ♂	5.5.08	19	do.	K—shot, suspicious		m	o	a	v	Blaeberry buds and *Calluna*	Incipient disease—some little redness

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1475	D ♂	5.5.08	18	Ross	Found dead		...	...	...	...	Empty	Disease—cæca very red
1476	D ♂	5.5.08	19	do.	do.		...	...	...	...	Half-full good green *Calluna* and low-ground leaves	do.
1477	I ♂	7.5.08	18½	Inverness	K—shot, suspicious	v	m	o	excessive	v	v	Disease—cæca red
1478	D ♂	7.5.08	18	Sutherland	Found dead		m	o	v	v		Bad worm enteritis
1479	D ♂	6.5.08	20¼	Ayr	do.	v	...	...	v	m	v	do.
1480	I ♂	8.5.08	16¾	Inverness	Found dying—caught	v	v	o	excessive	v		Bad worm enteritis—very red
1481	D ♂	8.5.08	20	do.	Found dead	v	m	o	v	m	v	do.
1482	I ♂	9.5.08	18½	Moray	Found dying—caught	v	...	...	excessive	v		Disease—cæca very red
1483	♀ *	8.5.08	12½	Surrey (Frimley)	K—by cockerel							
1484	I ♀	9.5.08	19	Caithness	...		v	o	m	m	Moss, seed-capsules, little *Calluna*	Worm enteritis
1485	I ♂	7.5.08	18½	Sutherland	Found dying—caught	v	o	o	excessive	v		Disease—slight cæcal redness
1486	I ♂	9.5.08	22½	Selkirk	K—shot, sick		v	o	v	v	v	Incipient disease—worm enteritis
1487-1489†												
1490	D ♂	5.5.08	20	Caithness	Found dead		v	v	v	v		Disease—cæca very red
1491	I ♂	5.5.08	21	do.	do.	v	m	o	v		v	Rotten—worm enteritis.
1492	I ♂	7.5.08	20½	Inverness	K—shot, suspicious		v	o	excessive	v	Rush-heads; *Calluna*, Blaeberry leaves, various seeds	Incipient disease—cæca red
1493	D ♀	7.5.08	16½	do.	Found dead	v	o	o	v	v	v	Disease—cæca red

* Blackgame.

† Hand reared.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1494	D ♀	7.5.08	16½	Inverness	Found dead		m		m	v	various, *See* tube	Cæca very red
1495	D ♂	7.5.08	18	do.	do.		...	...	...	...	v	Worms
1496	H ♀	7.5.08	24	do.	K—shot, suspicious		v	o	v	v		Healthy—cæca red egg broken
1497	D ♂	7.5.08	15¼	Moray	Found dead		...	...	...	...	v	Cæcal enteritis
1498	D ♀	7.5.08	16¾	do.	do.		v	o	v	v		Disease—very red cæca
1499	D ♂	7.5.08	17	do.	do.		m	o	m	v	*Calluna* tops, moss, seed-capsules	do.
1500	D ♂	7.5.08	14	do.	do.		...	...	...	...		Cæcal enteritis
1501	D ♀	7.5.08	18½	Moray	Found dead	v	o	o	o	v	*Calluna* and Crowberry tops	Disease—very red cæca
1502	D ♂	8.5.08	17½	do.	do.	v	m	o	v	v		Disease—excessively red cæca
1503	D ♀	8.5.08	16½	do.	do.		v	o	v	m		do.
1504	D ♂	8.5.08	16½	do.	do.		...	...	...	...		Disease
1505	D ♂	8.5.08	17	do.	do.		...	...	...	...	*Calluna*, Rush-heads, various seeds, fern	Disease
1506	D ♂	8.5.08	17½	do.	do.		v	o	v	v	v	Disease—excessively red cæca
1507*												
1508	D ♂	9.5.08	15¾	Perth	Found dead		m	o	m	v		Worms bad
1509	I ♂	9.5.08	19	Inverness	Found dying	v	v	o	excessive	v		Worm enteritis
1510	D ♂	9.5.08	17¼	do.	Found dead		v	o	v	v	v	do.
1511	I ♂	6.5.08	18½	Banff	K—shot, suspicious		v	o	m	v	v	Worm enteritis—slight
1512	D ♀	6.5.08	16	Selkirk	Found dead	v	o	o	v	v	v	Worm enteritis
1513	D ♀	6.5.08	14	do.	do.	v	...	...	...	v	...	do.
1514	D ♂	8.5.08	18	Ayr	do.		o	o	m	v	...	Worms—bad
1515	D ♂	8.5.08	19½	do.	do.		v	o	m	v	...	Disease
1516	I ♀	11.5.08	16	Aberdeen	Found dying—caught	v	m	o	v	v	...	do.
1517	I ♂	9.5.08	18½	Inverness	K—shot	v	excessive	o	excessive	v	Very varied contents	Disease—cæca red
1518	I ♀	10.5.08	15	do.	do.	v	m	o	v	v	v	Disease

* Partridge.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1519	*											
1520	D ♀	11.5.08	17	Perth	Found dying	v	m	o	excessive	v	...	Disease
1521	†											
1522	I ♂	12.5.08	17	Moray	Found dying —caught	v	v	o	excessive	v	...	Worm enteritis
1523	D ♀	12.5.08	15	Perth	Found dead		m	o	m	v	...	Disease
1524	D ♂	11.5.08	23	Argyll	do.	v	v	o	m	v	...	Disease—cæca very red
1525	D ♀	13.5.08	13	Ayr	do.		m	o	m	v	Insects	Disease
1526	D ♀	13.5.08	15½	do.	do.	v	v	o	v	v	...	do.
1527	D ♂	13.5.08	17	do.	do.		v	o	m	v	...	do.
1528	D ♂	14.5.08	14	Lanark	do.	v	v	o	v	v	...	Disease—villi very red
1529	D ♂	14.5.08	15	do.	do.		m	o	m	v	v	Disease—slight redness, tumid
1530	I ♂	13.5.08	18	Inverness	Found dying —caught	v	v	o	v	v	...	Disease—villi very red
1531	I ♂	12.5.08	17	Sutherland	K—shot, suspicious		m	o	v	v	...	Very slight redness
1532	D ♂	15.5.08	17	Ayr	Found dead		m	some	p	v	v	Disease
1533	D ♂	16.5.08	15	Ross	do.	v	m	o	m	v	v	do.
1534	I ♀	16.5.08	16½	Selkirk	No note		m	some	m	v	...	No redness
1535	D ♀	16.5.08	14	Argyll	Found dead	v	m	o	v	v	...	Bad cæcal enteritis—worms
1536	I ♂	12.5.08	20½	Caithness	Too rotten and no note		v	o	...	v	Moss seed capsules and *Calluna*	Too long dead
1537	I ♂	9.5.08	20½	do.	K—shot		v	o	v	v	*Calluna* tops	Villi very red
1538	D ♀	7.5.08	16	do.	Found dead		v	o	v	v	v	do.
1539	I ♀	8.5.08	15	do.	Found dying —caught		m	o	m	v	v	Villi very slightly red
1540	I ♂	10.5.08	18¾	do.	K—shot		m	o	m	v	v	do.
1541	I ♀	8.5.08	20½	do.	do.		v	o	v	v	...	Villi red
1542	I ♂	6.5.08	18	do.	do.		v	o	v	v	...	No redness
1543	H ♂	9.5.08	23	do.	K—shot, plump		v	o	v	v	...	No redness—healthy
1544	I ♂	8.5.08	...	do.	K—shot		v	v	v	v	. .	Slightly red
1545	I ♀	20.5.08	14½	Sutherland	Found dying —caught	v	...	...	v. a	v	...	Worm enteritis

* Greyhen.

† Blackcock.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1546	♂	19.5.08	23	Selkirk	Found dead —rotten		v. a	o	v. a	v. a		No redness —not much wrong
1547	D ♂	18.5.08	18½	Moray	Found dead		v. a	o	v. a	v. a	...	Bad cæcal enteritis
1548	D ♂	15.5.08	20	Lancaster	do.		a	o	a	v	...	Worms
1549	D ♂	20.5.08	20¼	Perth	Found dead—large bird, poor condition		v	o	m	v		Villi very red—worm enteritis
1550	D ♀	19.5.08	18¼	Wigtown	Found dead on nest with two young		v	o	v	v		Villi very red
1551	D ♂	22.5.08	17¼	Elgin	Found dead		v	o	excess	v		Worms: villi red
1552	D ♂	22.5.08	22¼	Sutherland	Found dead—large bird		v	o	v	v		Villi very red
1553	D ♂	22.5.08	17½	Ross	Found dead		crammed	o	crammed	v	v	Bad disease
1554	D ♀	22.5.08	17	do.	do.		o	o	v. a	v		Worms
1555	H ♂	22.5.08	...	do.	K—suspicious		v. a	o		p		Healthy
1556	I ♂	23.5.08	20	Ross	Found dying—caught by dog		crammed	o	crammed	a		Incipient disease
1557	H ♀	24.5.08	24	do.	do.		a	o	crammed	v		Healthy
1558	I ♂	23.5.08	very thin	do.	Found dying —caught		o	o	m	v		Bad disease
1559	I ♀	24.5.08	do.	Moray	do.		f	o	a	v		Worst type worm disease
1560	D ♀	23.5.08	14½	Aberdeen	Found dead		o	o o	some	v		Bad worm enteritis
1561	H ♂	20.5.08	23	Argyll	K—shot		some	o	some	v	v	Healthy
1562	D ♀	19.5.08	17	Inverness	Found dead	v	f	o	m	v		Very bad worms
1563	D ♂	20.5.08	17½	do.	do.	v	a few	o	m	v		Bad disease
1564	D ♂	20.5.08	17	Moray	do.		crammed	o	m	v		Bad disease—worm enteritis
1565	D ♀	20.5.08	16	Inverness	do.	v	o	o	many	v		Worst type
1566	H ♂	19.5.08	22	Inverness	K—shot, suspicious, large bird		crammed	o	crammed	v	mainly *E. tetralix* tops	Very little wrong
1567	D ♂	20.5.08	16	Ross	Found dead	v	crammed	o	m	v		Worm disease
1568	I ♂	23.5.08	17	Inverness	Found dying —caught		f		m	v		do.
1569	I ♀	22.5.08	12	do.	do.		f		m	m		Bad disease
1570	D ♀	22.5.08	13	Caithness	Found dead	v	m		m	m		Disease

No.	Sex	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1571	I ♂	24.5.08	15½	Yorks	Found sick —caught		m		m	v		Disease
1572	I ♂	23.5.08	18	Yorks.	Found sick		f	o	crammed	crammed		Worm disease
1573	D ♂	23.5.08	18	do.	Found dead	v	o	o	m	v		Worm pining
1574	D ♀	23.5.08	15	Inverness	do.	v	v	some	m	many	v	Worm disease
1575	D ♂	23.5.08	14	do.	do.	v	a good few	o	m	v		do.
1576	♀	26.5.08	16	Surrey (Frimley)								
1577	I ♂	27.5.08	18	Inverness	Found dying —caught		m	o	m	v		Worm enteritis
1578	D ♂	27.5.08	14½	Banff	Found dead		a few	v	m	v	v	Worm disease
1579	D ♂	27.5.08	16	do.	do.		...	...	m	f	v	do.
1580	D ♀	29.5.08	13	Ayr	do.		a few	o	m	v		Worm enteritis
1581	D ♂	27.5.08	15½	Yorks.	do.		o	o	v	v	v	do.
1582	H ♂	1.6.08	22	Dumbarton	K—shot		crammed	o	crammed	v		Healthy, but worm infested
1583	D ♀	2.6.08	15½	Caithness	Found dead		f	o	f	f		Worms
1584	D ♂	2.6.08	18	Perth	do.		some	o	m	v		Slight case worms
1585	I ♂	3.6.08	19	Inverness	Shot—suspicious		few		a	v		Slight case worms
1586	D ♀	4.6.08	13	do.	Found dead		o	o	o	v		Bad worms
1587	I ♀	2.6.08	18½	Yorks.	Found dying —caught		crammed	o	v. a	v	v	Worms
1588	D ♀	8.6.08	16	Inverness	Found dead		m	o	m	v	Empty	Chronic Grouse Disease—worms
1589	D ♂	10.6.08	17	do.	do.		o	o	m	v	v	Very bad worms
1590	... ♂ juv.	10.6.08	...	Perth	do.		...	...	...	...	v	...
1591	D ♀	16.6.08	14½	Ross	do		...	...	...	...	...	Maggoty
1592	D ♂	16.6.08	16	Yorks.	do.		...	...	...	...	...	do.
1593	I ♂	21.6.08	14¾	Ross	Found dying —caught		m	o	v. a	v	v	Disease
1594	D ♀	22.6.08	11½	Durham	Found dead		...	...	...	...		Maggoty
1595	I ♀	23.6.08	17	Aberdeen	Found dying—caught by dog		v	o	v	v		Worms and oversitting
1596	♀	29.6.08	21	Ross	Found dead		...	...	...	...		Maggoty
1597	I ♀	30.6.08	14½	Moray	Found dying		o	o	m	v		Worms and oversitting
1598	I ♀	4.7.08	15¾	Caithness	Found dying —caught		some	o	v	v	Pennywort, Rush-heads, &c.	Chronic worm disease

No.	Sex.	Date.	Weight in ozs. (Av.)	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1599	I ♂	4.7.08	17	Inverness	K—shot, suspicious		o	o	v	v	Rush-heads, *E. cinerea* flower, moths and various seeds	Cæcal worms
1600	H ♂	4.7.08	26	do.	K		a few	o	a	v		Healthy
1601	I ♀	8.7.08	8½	Argyll	Found dying—caught		v	o	v	heaps	Empty	Worms and oversitting
1602	I ♀	10.7.08	17¾	Midlothian	do.		some, few	o	enormous masses	excessively abundant		do.
1603	I ♀	5.7.08	16	Yorks.	Found dying—caught by dog		p	o	f	v		do.
1604	I ♂	6.7.08	17¾	do.	Found dying—caught		good many	o	crammed	v	v	Damage by fence and worms
1605	I ♀	6.7.08	15	do	do.		some	o	crammed	thousands	v	Worms and oversitting
1606	D ♂	13.7.08	18¼	Roxburgh	Found dead		f	o	f	v		Bad worms and split bill
1607	I ♀	13.7.08	15	Caithness	do.		o	o	v	a	v	Exhaustion from oversitting
1608	H ♂	13.7.08	20½	Caithness	Found dead—shot, or fence		m	o	m	p	Moss seed-capsules, *Calluna*, *Tormentilla* flower, rush-heads, etc.	Accidental. Case of recovered worm disease
1609	I ♀	15.7.08	14	Inverness	K—shot		v	o	f	v	v	Exhaustion from oversitting
1610	I ♀	15.7.08	13	do.	Found sick—caught		o	o	crammed	v		Oversitting and bad case worms
1611	D ♂	14.7.08	18½	Perth	Found dead		o	many	o	v		Bad disease
1612	D ♂	15.7.08	16	Inverness	do.		o	o	a	v		do.
1613	...juv.	17.7.08	6	Yorks.	Caught		m	o	o	o		Healthy
1614		20.7.08	15	Surrey (Frimley)	K							
1615*	...											
1616	I ♀	16.7.08	15¾	Inverness	Found dying—caught by dog		o	o	p	v	Few bits fresh green *Calluna*	Exhaustion from oversitting and worms

* Partridge.

No	Sex.	Date.	Weight in ozs. (Av.)	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1617	D ♀	22.7.08	17	Yorks.	Found dead		o	o	many	v	Nearly full *Calluna* tops and many daddy-longlegs, etc.	Worms
1618	♂		14	Surrey (Frimley)	do.							Fighting and exhaustion
1619	D ♀ ad.	28.7.08	15½	Forfar	do.		a few	o	p	v	Ripe Blaeberries and Crowberries	Worms
1620	1 ♀	28.7 08	18½	Yorks.	do.		crammed	o	crammed	a	A little fresh green *Calluna* and *Calluna* flower-buds	Oversitting — exhaustion
1621	I ♀	26.7.08	13	do.	Found dying		...	a few	v	v	Empty	do.
1622	I ♀	26.7.08	16½	do.	do.		crammed	o	crammed	v		do.
1623	... ♀ juv.	7.08	9	Ross			some	o	a few	very few	*Calluna* tops, green, fresh. *See* book.	Healthy
1624	1 ♀	30.7.08	16	Durham	do.		...	...	...	v	Empty	Worm enteritis and exhaustion
1625	I ♀	5.8.08	15	Nairn	Found dying —caught		full of, in a mass	o	crammed	crammed	Empty	Exhaustion — bad worms
1626	... ♂ juv.	1.8.08	11½	Kintyre	Found dead		...	...	...	...		Accident—breast broken
1627	I ♂	31.7.08	21	Argyll	Found dying —caught and killed		v	o	o	p	*See* book	Accident to crop
1628	... ♂ juv.	11.8.08	12½	Ross	Found dead		m	o	v	v	Empty	Accident
1629	I ♂	13.8.08	15	Aberdeen	Found dying —killed with stick		a few	o	crammed	v. a	About 1 doz. clusterberries	Worms
1630	I ♀ ad.	12.8.08	15	Inverness	K—shot, suspicious		m	o	m	a	½-full *Calluna* tops, rushes, *Tormentilla* heads	Oversitting and worms
1631	1 ♂	13.8.08	18½	Ross	do.		m	o	m	v	*See* book	Worms and cæcal enteritis
1632	1 ♂	13.8.08	16	do.	do.		m	o	m	m	A little *Calluna* tops and *Erica tetralix* flower	Worms
1633	H ♀	13.8.08	17	Inverness	K—shot		m	o	m	f		Healthy except for worms

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1634	I ♀	12.8.08	20	Lanark	K—shot		v	o	v	v	Almost empty—little *Calluna* flower	Cystic sebaceous disease of skin
1635	I ♂	10.8.08	15½	Selkirk	Found dying		o	o	a	v		Worms
1636	I ♀ ad.	13.8.08	16	Durham			a	o	a	v		Oversitting and worms
1637	I ♀	14.8.08	16	Forfar	K—shot		a		crammed	v		Overset
1638	I ♀	13.8.08	17½	do.	K		a		m	v		do.
1639	I ♂	8.08	18	Ayr			o	o	f	a	Little green *Calluna* tops and flower	
1640	... ♂ juv.	8.8.08	7	Nairn	Found dying—caught		...	...	m	a few		
1641	I	31.7.08	15	Midlothian	Caught by dog		...	...	many	f		Worms
1642	I ♀ ad.	12.8.08	14½	Perth	K—shot, suspicious		o	o	many	v	*See* book	Oversitting and worms
1643	... ♀ juv.	12.8.08	6	do.	K—suspicious		a	o	p	many	Green *Calluna* tops	Worms
1644	I ♀	13.8.08	15¾	Inverness	K—shot		a	o	v	a	Empty	Worms and exhaustion from oversitting
1645	... ♀ juv.	14.8.08	10	Yorks.	K—shot		o	a few	o	v	Empty	Worms: recovering with berry diet
1646	I ♂ ad.	14.8.08	18½	do.	do.		m	o	m	heaps		Slight worms
1647	I ♀ ad.	14.8.08	16½	do.	do.		m	o	m	a		Exhaustion from oversitting and worms
1648	I ♀	14.8.08	15¾	Aberdeen	do.		...	...	p	v	Ripe black Crowberries, *Calluna* tops and flowers	Worms and oversitting
1649	I ♂	14.8.08	17½	do.	do.		...	o	heaps	v	Empty	Worms
1650	I ♂	14.8.08	17	Perth	K—shot, suspicious		v	o	m	m	do.	do.
1651	I ♂	14.8.08	18	do.	do.		o	o	m	a	A little *Calluna* flower	do.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1652	I ♀ ad.	17.8.08	13¾	Ross	Found sick ?		m	o	m	m	*Calluna* flower	Worms and exhaustion from oversitting
1653	I ♀ ad.	13.8.08	17	Stirling	K—shot		m	o	v	v		Worms and oversitting
1654	I ♂ ad.	7.8.08	18	Inverness	Found dying —caught		o	o	a	a		Worms
1655	I ♀	12.8.08	15½	Sutherland	K—shot, suspicious		v	o	v	m	*Calluna* tops and buds	Oversitting and worms
1656	I ♀ ad.	12.8.08	10	do.	do.		o	o	p	a	*Calluna* green tops, small rush-heads	do.
1657	I ♂ ad.	12.8.08	18	do.	do.		v	o	m	a	*Calluna* green tops, *Tetralix* flower, hairy rush	Worms
1658	I ♂	12.8.08	22	do.	do.		m	o	p	m	Nearly empty —*Calluna* tops, *Tetralix* flower, few rush-heads	do.
1659	I ♂ ad.	12.8.08	19½	do.	do.		some	o	p	a	*Calluna* green tops, hairy rush-heads, *Tetralix* flower	do.
1660	... ♀ juv.	8.08	9½	Aberdeen	Found dead		...	...	m	p	*See* book	Bled to death by lungs—worms
1661	I ♂	17.8.08	18	Banff	K—shot		some	o	m	v		Worms—cæcal enteritis
1662	D ♂	17.8.08	17	Yorks.	Found dead		p	o	m	v		Bad case worms
1663	1 ♀ ad.	18.8.08	16	Wigtown	K—shot, suspicious		m	o	m	a	Empty	Oversitting and worms
1664	... ♀ juv.	20.8.08	9½	Yorks.	Found dying—caught by dog		m	o	m	a	*Calluna* flowers and green tops	Worms, but killed by damage to lung
1665	I ♀ ad.	19.8.08	13½	Aberdeen	K		o	o	m	v	*Erica tetralix* flower only	Worms and oversitting
1666	I ♀ ad.	19.8.08	16	do.	K		a few	o	enormous masses	v	Empty	do.

No.	Sex.	Date.	Weight in ozs. (Av.)	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1667	D ♀	21.8.08	14½	Caithness	Found dead		m	o	v	v	½-full *Calluna* flower, few rush-heads, 1 ripe Crowberry	Worms and oversitting
1668	I ♀ ad.	17.8.08	15½	Perth	K—shot		m	o	m	v	Low ground food	
1669	I ♀	17.8.08	16½	do.	do.		m	o	m	v	do.	
1670	D ♀	8.08	16	Caithness	? Found dead		m	o	enormous mass	v	A little *Calluna* tops and flower	do.
1671	I ♂	8.08	17½	Aberdeen	Found dying—caught by dog		v	o	enormous masses	m	Empty, stained with berries	Worms
1672	I ♀ ad.	20.8.08	14½	Berwick	Found dying		crowd	o	crowded	v	*Calluna* tops, ripe Crowberries, triangular seed capsules	Worms and oversitting
1673	I ♂	25.8.08	18½	Perth	Found dying—caught		m	o	m	a	*See* book	Worms
1674	I ♀	25.8.08	14	do.	K—shot		...	...	...	...		do.
1675	... juv.	27.8.08	15	Inverness	Found dying—caught		o	o	o	v		
1676	I ♀ ad.	25.8.08	17	Westmoreland	Found sick—caught and killed by hand		o	o	large masses	full	Few pieces *Calluna*	Exhaustion from oversitting and worms
1677	I ♀ ad.	26.8.08	15½	Perth	K—shot		o	o	a	a	A few bits green *Calluna* tops	Exhaustion from oversitting
1678	I ♀ ad.	26.8.08	18¼	do.	do.		v	o	a	a		do.
1679	I ♂ ad.	28.8.08	16	Sutherland			o	o	a	a	*Calluna* shoots and flower	Worms
1680	... ♀ juv.	28.8.08	15	do.			few fragments	o	a	v	Empty	Exhaustion from oversitting
1681	... ♂ juv.	24.8.08	15½	Inverness	K		...	...	...	a		Acute osteomyelytes
1682	I ♂ ad.	8.08	16	Sutherland	? Shot		a	o	a	a	Very small quantity *Calluna*	Worms

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1683	I ♂ ad.	8.08	16	Sutherland	? Shot		v		v	v	Fairly large amount *Calluna* and flower	Worms
1684	... ♀ juv.	8.08	13	do.	do.		o	about 1 dozen	few	few	½-full *Calluna* and flower	do.
1685	H ♀ ad.	26.8.08	20	Argyll	K		few fragments	o	large quantity	fair number	¾ full of *Calluna* and flower	Healthy—but infested by worms
1686	I ♀ ad.	28.8.08	19	do.			v. few	o	v	a	*Calluna* shoots and flowers	Exhaustion from over-sitting
1687	I ♀ ad.	22.8.08	20	Perth	K—shot		o	o	a	v	Blaeberry leaves, ripe Blaeberries, *Calluna* tops and flowers and 1 unknown berry	Worms and sitting, not much wrong
1688	I ♀ ad.	21.8.08	17½	do.			v	o	o	v	Empty	Exhaustion from over-sitting and worms
1689	I ♀ ad.	21.8.08	18½	do.			o	o	few	v	Empty	do.
1690	I...	8.08	18	Wales (Montgomery)								Worms
1691	I...	8.08	16	do.	Found dying							do.
1692	H ♂	26.8.08	24	Argyll	K		large quantities	o	large quantity	very few	Small quantity *Calluna* and flower	Healthy—but infested by worms
1693	... ♀ juv.	26.8.08	17½	do.	K		few		small quantity	few	*Calluna* and flower—Potentilla, seed heads	
1694	... ♂ juv.	8.08		Ross	K		a	o	a	fairly abundant		Not much wrong
1965	... ♂ juv.	8.08	20	do.	K		m	o	a	do.		do.
1696	H ♂	24.8.08	25	Inverness	K—shot		v			m		Healthy
1697	... ♂ juv.	24.8.08	16	do.	do.		v	o	v	v		
1698	...juv.	26.8.08	16	do.	K				v	v		
1699	H ♂ ad.	26.8.08	24½	do.	K		o	o	o	crammed		

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death
1700	... ♀ juv.	20.8.08	7	Inverness	Found dead		m	o	m	a	Empty	Worms
1700a	... ♂ juv.	29.8.08	8	Nairn	do.		not many	o	one or two	plenty	do.	do.
1701	D ♀ ad.	29.8.08	16	Wigtown	do.		m	o	m	excessive	Very full green *Calluna* tops and rush-heads	Exhaustion from over-sitting and worms
1701a	... ♂ juv.	29.8.08	15	Nairn	do.		a few	o	...	fairly abundant	*Calluna* flower and green tops	Worms
1702	I ♂	1.9.08	18½	Yorks.	Found dying		m	o	m	excessive	A few rush-heads	do.
1703	D ♂ ad.	1.9.08	15	Yorks.	Found dead		a few		good many	v. a	*See* book	Acute inflammation of crop
1704	I ♂ ad.	1.9.08	19	Yorks.	K		m	o	m	enormous numbers		Worms
1705	I ♀ ad.	22.8.08	15½	Aberdeen	Found dying		o	o	very few	excessive	Empty	Exhaustion from over-sitting
1706	I ♂ ad.	28.8.08	22	Wales	Found sick—caught		plenty, in masses		not excessive	v. a	Blaeberry and red Whortle-berries	Worms
1707	H ♂ ad.	28.8.08	20	do.	K—shot		o	o	enormous masses	excessive	½-full *Calluna* flower and green	
1708	H ♂ ad.	27.8.08	21	do.	K		o	o	crowded	v	*Calluna* flower and green	
1709	I ♀ ad.	27.8.08	16	do.	K		m	o	v	excessive		
1710	I ♀ ad.	27.8.08	17	Wales	K		...	...	excessive	excessive	*Calluna* flower and tops	
1711	I ♂ ad.	27.8.08	14	Nairn	Found sick—caught by dog							
1712	I ♂ ad.	27.8.08	21½	Peebles	K—shot		...	...	f	f		Worms, but very little wrong
1713	H ♂ ad.	27.8.08	22	do.	do.				v	v		Really healthy
1714	I ♂ ad.	28.8.08	18	Nairn			m	o	m	excessive	Little fresh green *Calluna*	
1715	H ♂ ad.	28.8.08	23	Ayr			one or two	o	a few	p		Healthy
1716	I ♀ ad.	28.8.08	14½	do.			m	o	m	excessive	*Tormentilla* seed heads and green *Calluna* tops	Exhaustion from over-sitting

No	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1717	I ♀ ad.	28.8.08	14½	Ayr			one or two	o	p	thick		Exhaustion from over-sitting
1718	I ♂ ad.	28.8.08	20				good many	o	good many	v. a	Fresh green *Calluna*	Fairly healthy
1719	I ♀ ad.	28.8.08	17				o	o	a few	a	do.	do.
1720	H ♂	28.8.08	24	Dumbarton	K—shot		o	o	a few	good many	...	Very healthy
1721	I ♀	31.8.08	21	Nairn	Found sick—caught by dog		few bits	o	a	a	*Calluna* flower and Blaeberry leaves	Slight worm enteritis
1722	H ♂	31.8.08	21¼	Aberdeen	K—shot		o	o	a	excessive	Empty	Probably worms
1723	I ♂ ad.	31.8.08	16½	do.	do.		o	a few	o	excessive	A few leaves	Worms—recovering
1724	I ♀ ad.	31.8.08	18	do.	do.		...	...	p	...		Exhaustion from over-sitting
1725	I ♂ ad.	2.9.08	16	Midlothian	Found sick—killed by dog		good many	o	good many	excessive	*See* book	Worms
1726	I ♂ ad.	31.8.08	17	Argyll	Found dying—caught		o	o	a few bits	excessive	Empty	Worst type of worms
1727	I ♀ ad.	4.9.08	16	Inverness	Shot		m	o	a	a	*Calluna* flower, *Tetralix* flower, whole heads	Worms and probably oversitting
1728	I ♀ ad.	2.9.08	15	Nairn	Found dying		m	o	m	excessive	Empty	do.
1729	I ♂ ad.	2.9.08	21½	Perth	K– suspicious		m	o	o	excessive	*Calluna* and many red-legged black flies	Worms
1730	I ♂ ad.	2.9.08	18½	Perth	K—suspicious		m	o	p	excessive		Bad case of worms
1731	I ♂ ad.	2.9.08	19	do.	do.		v	o	v	excessive	Green *Calluna* tops and oats	Worms
1732	I ♂ ad.	3.9.08	16½	Inverness	Found dying		m	o	m	v. a		Worm enteritis—bad case cæcal congestion
1733	I ♂ ad.	5.9.08	17¼	Moray	K		p	o	m	v	A few red berries	Worm enteritis
1734	I ♀ ad.	5.9.08	16	do.	K—shot			o	m	v		Worms
1735	I ♂ ad.	5.9.08	19	do.	K		good many	o	m	numerous	*Calluna* flower and green tops, *Tetralix* flower and red berries	do.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1736	I ♂ ad.	3.9.08	15¼	Yorks.	K—shot		p	o	p	a	Blaeberry flower and leaf, green *Calluna* tops	Worms
1737	I ♂ ad.	3.9.08	18	do.	K		m	o	m	a	*Calluna* flower and daddy-longlegs	do.
1738	... ♂ ad.	3.9.08	...	do.	Shot		...	...	...	...	*Calluna* green tops and a few Blaeberry leaves	
1739	... ♂ ad.	5.9.08	18	Yorks.	Found sick—caught		a good many	some	m	p	Empty	Shot wounds
1740	D ♂ ad.	10.9.08	16	Selkirk	Found dead		o	o	o	excessive	do.	Very bad threadworms
1741	I ♂ ad.	13.9.08	16	Stirling	Found sick—caught		a few	o	excessive	excessive	*Tormentilla* seed heads & a few leaf bits	Bad worms
1742	... ♀ juv.	13.9.08	15	Perth	K—shot		...	...	...	...	*Tetralix* flower, dead brown, *Calluna* fresh green and flower, *Tormentilla* seed	Healthy
1743	H ♂ a.	13.9.08	...	Perth	K		p	o	p	p	*See* specimen	Healthy
1744	H ♂ ad.	13.9.08	19⅓	do.	K—shot		m	o	m	p		Bumble toe
1745	H ♀ ad.	12.9.08	20⅓	Dumbarton	do.		o	o	m	v. a		do.
1746	I ♂ ad.	12.9.08	17½	Argyll	do.		some	o	a few	very full		Worm piner
1747	I ♂ ad.	15.9.08	21	Forfar	Shot		o	o	enormous masses	excessive	*Calluna* tops and flower	Worms
1748	I ♂ ad.	15.9.08	18½	Forfar	K—shot		...	o	m	excessive	*Calluna* tops & flowers & Blaeberry leaves	do.
1749	I ♂	15.9.08	17½	Forfar	K—shot		...	o	m	crammed	v	Disease
1750-1752*												
1754	I ♀	19.9.08	16	Inverness	Found dying—caught		o	o	m	f	Empty	Bad worms
1755	I ♀	17.9.08	15¼	Perth	K—shot		o	o	m	excessive	v	Bad disease
1756	I ♀	19.9.08	14	Nairn	Found sick and caught		o	o	in great quantities	v. a		Disease

* The intervening Nos. Maggoty.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death
1757	I ♂ ad.	19.9.08	16	Nairn	Found sick—caught		o	o	o	excessive		Disease—old shot wounds
1758	H ♂ ad.	19.9.08	23	Perth	Found dead—accident		some		a	v. a		Healthy
1759	... ♂ juv.	23.90.8	14¾	Dumfries	Found dead—hand reared							Gapeworm in trachea
1760	I ♂	23.9.08	14¼	Yorks.	Found sick—caught		o	v	a	excessive	Empty	Worm disease—engorged mesenteric vessels
1761	I ♀	22.9.08	17½	Sutherland	Probably shot		a	o	a	excessive	Enormous	
1762	H ♂ ad.	23.9.08	26	do.	Found dead		o	o	o	a good many	Green *Calluna* tops and flower	Healthy—damaged by collision or shot
1763	... ♂ ad.	28.9.08		Northumberland	K—shot						Green *Calluna* tops and flower heads	No entrails
1764	H ♂ ad.	28.9.08	21½	do.	do.		very few		some	p	Green *Calluna* tops and flower, and grass seeds.	*See* book—worms
1765	...juv.	1.10.08	19¾	Inverness	K—shot		...	...	...	...		Bumble foot
1766*												
1767	I ♂ ad.	26.9.08	17	do.	Found dying		fair number		m	excessive	Empty	Worms disease
1768	H ♂ ad.	23.9.08	23	Ayr	K—shot		a few	o	good many	very full—no red villi	Green *Calluna* tops	Worms—not bad
1769	I ♀ ad.	23.9.08	17½	do.	do.		a few		good many	v. a—no red villi	Green *Calluna* tops	Exhaustion from over-sitting and worms
1770	I ♂ ad.	23.9.08	16½	do.	do.		...	...	...	...	...	
1771	I ♀ ad.	23.9.08	16	do.	do.		...	...	...	...	...	...
1772	I ♂ ad.	23.9.08	...	Stirling	...		o	o	a	a	Green *Calluna* tops	Worms
1773†												
1774	I ♀ ad.	5.10.08	14¼	do.	Caught by dog—very weak		bits	o	a	a	*Calluna* tops—green Blaeberry leaves	Longstanding hurt—collision

* Pheasant, † Blackcock.

No.	Sex.	Date.	Weight in ozs (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1775	1 ♀ ad.	1.10.08	17	Perth	K—shot		...	o	v. a	v. a —no red villi	Blaeberry and *Calluna* tops	Disease
1776	1 ♀ ad.	1.10.08	17	do.	do.		m	o	v	v	Empty	do.
1777	... ♂ juv.	30.9.08	16	Selkirk	Found dying —caught by dog		good many	o	v. a	v. a	...	Worm disease
1778	... ♂ juv.	3.10.08	19½	Argyll	K—shot, suspicious		o	o	do.	excessive —but no redness	...	Worms—fairly healthy
1779	... ♂ juv.	5.10.08	17	Inverness	K—shot, suspicious (very backward)		a few	o	excessive	excessive —but no damage done	Insects and some *Calluna* tops	Not much wrong—very backward
1780	... ♀ juv.	5.10.08	17	do.	K—shot, suspicious		o	o	m	mass—but no red villi	v	Very backward
1781	1 ♂	7.10.08	15½	Northumberland	K—shot, but arrived useless —maggots				...	...	...	Probably disease
1782	1 ♂	7.10.08	18¾	Yorks.	Found dying		m	o	crammed	m	v	Worms—worst type
1783	1 ♂ ad.	10.10.08	21¼	Forfar	K—suspicious		o	o	some	m	v	Incipient worm disease
1784	1 ♀ ad.	10.10.08	18	do.	do.		v	o	p	m	*Calluna*, rush-heads, few red berries	do.
1785	1 ♂ ad.	10.10.08	19	do.	do.		v	o	few	m	...	do.
1786	1 ♂ ad.	10.10.08	18¼	do.	do.		o	o	o	p	v	do.
1787	1 ♀ ad.	10.10.08	18½	do.	Found dying		v		v	v	v	do.
1788	1 ♂ ad.	10.10.08	17	do.	do.			o	m	m	v	do.
1789	1 ♀ ad.	8.10.08	22	Perth	Found dying—could scarcely fly—shot		...	o	...	excessive	Mass of insects	Incipient disease
1790	1 ♀	8.10.08	16	do.	do.		o	o	p	m	v	Usual worm disease—not sufficient for death
1791	1 ♀	8.10.08	19½	do.	Found dying—could scarcely fly—caught		v	o	some	m	...	Disease ; coccidia present

No.	Sex.	Date.	Weight in ozs. (Av.)	County.	Manner of death.	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1792	I ♂	15.10.08	18	Argyll	K—suspicious		o	o	o	a	*Calluna* tops and seed heads	Incipient disease only—scabs and irritable sores from ticks
1793	H ♂	20.10.08	23	Skye	K—crop too full to fly		m	o	a	m	Abnormally large crop. *See* specimen	Incipient disease—healthy
1794	I ♀	19.10.08	14	Inverness	K		o	o	many	m	Green *Calluna* tops and a few Bog Cranberry leaves	Disease
1795	I ♂	19.10.08	18½	Ayr	K—suspicious		o	o	one only	v	All caterpillars	do.
1796	I ♀	19.10.08	17½	do.	do.		o	o	o	a	½-full of caterpillars, *Calluna* tops and seed heads.	do.
1797	I ♀	20.10.08	15	Dumbarton	Found dying		p	o	v	a	Full of insects	do.
1798	I ♀	27.10.08	14¼	Argyll	Found dying near the sea		o	o	a	m	Many and various leaves, *Calluna*	do
1799	I ♂	29.10.08	18	Selkirk	Found dying		v	o	o	m	...	do.
1800	I ♂	29.10.08	19¾	Aberdeen	K		...	...	...	...	...	Perhaps incipient disease
1801	I ♀	10.11.08	13½	Dumfries	Found dying—could hardly fly		o	o	v. a	heaps	Blaeberry buds and stalks, *Calluna* green tops	Disease
1802*												
1803	I ♀	5.11.08	14	Ayr	Found sick—caught by dog	v	o	o	a	heaps	Empty	Disease ; coccidia present
1804	I ♀	4.11.08	17	Yorks.	Sick—killed by dog		o	o	v	v	Very full	do.
1805	H ♀	10.11.08	21	do.	K—suspicious. Plump, crop too full		...	...	...	...	*Calluna* green tops and seed heads	Healthy
1806	H ♀	9.11.08	21	Perth	K		o	o	o	v. a	Blaeberry buds and stalks, Clusterberry leaves	Healthy ; coccidia present

* Greyhen

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin pre-served.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1807	I ♀	9.11.08	16½	do.	K—shot in ordinary course		o	o	p	v. a		Disease ; coccidia present
1808	H ♂	9.11.08	20	do.	do.		o	o	v	do.	Empty	Healthy ; coccidia present
1809	H ♀	9.11.08	16	do.	do.		o	o	o	p	*Calluna* green tops, Blaeberry stalks and buds	do.
1810	I ♂	10.11.08	19½	Caithness	K—suspicious		o	o	v	very excessive	...	Bad cæcal enteritis
1811	I ♂	14.11.08	17	Ayr	do.	v	v		v	a	v	Disease begun
1812	I ♂	20.11.08	18	Kirkcudbright	do.	v	o	o	v	m	Green *Calluna* tops and seed heads, equal parts	Disease
1813	I ♀	20.11.08	17¾	do.	do.	v	...	...	o	a		Worm disease
1814	H ♀	9.12.08	17	Aberdeen	K		o	o	o	v	Fresh green *Calluna* tops only	Quite healthy
1815	I ♀	10.12.08	16	Yorks.	K—suspicious		o	o	a	a	*See* book	Bad cæcal enteritis
1816	D ♀	10.12.08	15½	Ayr	? Found dead or K—suspicious		o	o	a	a	Crop full—very unusual contents	Cæcal enteritis
1817	D ♂	10.12.08	15½	do.	do.		o	o	some	some	Crop full. *See* book	do.
1818*												
1819†												
1820	I ♀	30.1.09	17½	Perth	Found sick	very back-ward	o	o	v. a	v. a	o	Disease, and hurt badly some time before
1821	II ♂	10.2.09	22	Fife	K	v	o	very many	packed	none found	*See* book. Willow, etc.	Healthy
1822				Surrey (Frimley)			o	o	o	o		
1823	I ♀	1.3.09	19½	Argyll	Found dead		o	o	v	p	Green *Calluna* tops and black ditch water and diatoms	Worms, and probably accident

* Cock pheasant.

† Water rail.

No.	Sex.	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1824	H ♀	21.3.09	20	Cumberland	Found dead—but warm		bits only	o	o	fairly abundant	Empty	Healthy—probably fence
1825	I ♀	29.3.09	15½	Yorks.	Found dying	v	very few	o	v. a	v. a	do.	
1826	H ♀	31.3.09	23	Dumbarton	K		large quantity	o	v. a —large and ripe	quite abundant	Winter *Calluna* tops only ⅓ full	
1827	D ♀	30.3.09	15½	Yorks.	Found dead		not very abundant	o	considerable numbers	v. a	Blaeberry stalks and *Calluna* tops	Worms—typical case.
1828	H ♂	25.3.09	24	Ross	K		v	o	v	v		Healthy
1829	H ♂	25.3.09	23	do.	K		v	o	v	v		do.
1830	H ♂	25.3.09	25	do.	K		...	a	v	...		do.
1831	H ♂	24.3.09	...	Inverness	K		...	...	...	...		Sent to Cambridge for section pickling
1832	H ♂	24.3.09	...	do.	K		...	...	...	...		
1833	D ♂	8.4.09	21	do.	Found dead	very rotten	present	o	very numerous	v. a	Empty	Worms
1834	I ♀	24.4.09	13	Yorks.	Found dying		m	o	a	do.		Worms—very bad
1835	D ♀	29.4.09	16	Haddington	Found dead		...	v. a	...	v	Empty	Worms
1836	D ♀	29.4.09	13	do.	do.	v	...	...	...	a		do.
1837	D ♂	29.4.09	17½	Peebles	do.		m	o	a few	a	do.	do.
1838	I ♂	27.4.09	20	Haddington	do.		m	o	present	v		Worms and accident
1839	I ♂	27.4.09	20	do.	K—suspicious		m	o	o	v. a	Blaeberry stalks, much brown *Calluna*	Worms
1840	D ♀	27.4.09	19	do.	Found dead		...	...	...	v. a	Rather old *Calluna*	do.
1841	I ♂	26.4.09	18	Perth	do.		a few	o	crammed	v. a	Empty	Death by collision in a case of worms
1842	D ♀	27.4.09	17½	Inverness	do.		f	o	a	v	do.	Worms
1843	D ♀	27.4.09	14	do.	do.		m	o	present	v. a		do.
1844	D ♀	27.4.09	17	do.	do.		o	o	...	a	A little *Calluna* green tops	do.
1845	D ♀	27.4.09	16	do.	do.	v	m	o	a	a		do.

No.	Sex	Date.	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1846	D ♀	3.5.09	15	Perth			v. a	o	v. a	v. a	Green *Calluna* tops, abnormal proventriculus	Worms
1847*												
1848	D ♂	4.5.09	18½	Selkirk	do.		m	o	o	v		Effusion of blood on brain—bad worms
1849	D ♂	4.5.09	21	do.	do.		a	o	a	a	Grass, sorrel and *Calluna*	Worms
1850				Frimley			o	o	...	...		
1851	H ♀	30.4.09	25	Dumbarton	K		very few	o	a	p	Blaeberry stems and buds and leaves, *Calluna* tops	Healthy
1852	D ♀	3.5.09	17	Perth	? Found dead		v. a	o	v. a	v. a		Very bad worms
1853	D ♀	29.4.09	16	Roxburgh	do.		m	o	crammed	crammed		Bad worms
1854	D ♂	29.4.09	20	do.	do.		o	o	a	v. a	Blaeberry and *Calluna* tops	Not worst type of disease
1855	D ♀	1.5.09	15	do.	do.		small mass	o	very few	f		Bad worms
1856† }												
1857† }												
1858	D ♂	8.5.09	14	Inverness	do.		m	o	o	v. a		Cæcal enteritis
1859	I ♀	8.5.09	15½	Inverness	Found dying		m	o	crammed	excessively numerous	Empty	do.
1860	H ♀	10.5.09	21½	do.	K		o	o	crammed	p		Healthy
1861	D ♂	15.5.09	17	Northumberland	do.		a	o	some	v. a	Very little—some dwarf willow buds and *Calluna*	Worms
1862	H ♂	12.5.09	22	Haddington	K—suspicious		...	a	a	v. a		Fairly healthy
1863	I ♂	11.5.09	21½	Aberdeen	K		very few	o	o	p		Slight disease—not bad at all
1864	I ♀	15.5.09	13½	Selkirk	Found dying		v. excessive	o	o	excessive		Worms
1865†												
1866	D ♂	14.5.09	19½	Northumberland	Found dead		crammed	o	crammed	excessive numbers		Worms
1867*												
1868	D ♂	17.5.09	16	Berwick	do.		v	o	v	excessive		Very bad case of worms.

* Blackgame. † Ptarmigan.

No.	Sex.	Date.	Weight in oz. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1869	D ♂	17.5.09	17½	Berwick	Found dead		m	o	m	m		Very bad case of worms
1870	I ♀	17.5.09	14	do.	Found dying		m	o	crowds	a		do.
1871*												
1872	I ♀	17.5.09	14½	Roxburgh	do.		m	a few	o	very many, almost in masses		Worms
1873	I ♀	17.5.09	16	Perth	do.		o	o	a few	excessive		Worst type worms disease
1874	I ♀	18.5.09	14½	Selkirk	do.		m	o	o	m		Worst type cæca
1875	I ♀	19.5.09	15	Yorks.	K—suspicious		m	o	very large masses	v. a	*Calluna* tops, *Tetralix* tops, sheep sorrel leaves	Bad case of worms
1876	I ♂	19.5.09	17	do.	do.		excessive	o	excessive	excessive		do.
1877	I ♀	19.5.09	15	do.	do.		...	...	...	...	*Calluna* tops & small Blaeberry leaves	Coccidiosis
1878	D ♀	23.5.09	15	Inverness	Found dead		o	o	o	very great numbers		Ordinary case of worms
1879	D ♀	23.5.09	16	do.	do.		o	o	large numbers	v. a		do.
1880	I ♀	27.5.09	...	Inverness	Found dying		v	o	v	v		Worms, coccidia present
1881	... ♂	27.5.09	...	do.	K		v	o	v	v		Coccidia present
1882*												
1883	I ♂	4.5.09	14	do.	Found dying		m	o	a	v. a		Coccidiosis moderate—worms
1884	I ♀	4.5.09	15⅓	do.	do.		some	o	v. a	v. a		Worms
1885	I ♂	7.5.09	18½	Argyll			...	...	fully infected	v		Disease
1886	I ♂	7.5.09	21	do.	Very rotten		...	...	f	f	Full of *Calluna* tops	do.
1887	D ♂	10.6.09	19	Inverness	Found dead		...	...	...	v		do.
1888	...juv. (3 days)	6.09		do.			...	...	...	a		
1889	I ♀	11.6.09	14½	do.	Found dying		...	...	...	...		Disease

* Blackgame.

No.	Sex.	Date	Weight in ozs. (Av.).	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1890	I ♀	11.6.09	16	Inverness	Found dying		a	o	...	v		Coccidia present—cæcal enteritis
1891	I ♂	11.6.09	16	do.	do.		a	o	...	excessive		do.
1892	D ♂	1.6.09	16	Midlothian	Found dead—very rotten		m	o	v	do.		Worms
1893	D ♂	1.6.09	15½	do.	do.		...	...	...	v		do.
1894	I ♂	25.5.09	15	Aberdeen	Found dying		v	o	v	excessive		Worms—cæcal enteritis
1895	D ♀	9.6.09	13	Argyll	Found dead		...	...	...	excessive		Worms
1895a	... ♀	25.5.09		Ross	...							
1895b	...				...							
1896	... ♂ juv.	23.6.09	3	Perth	Found dead		a few	...	o	o		Coccidiosis
1897	...juv.	6.09	5¾	Inverness	K		...	...	...	...		
1898	H ♂	30.6.09	23¾	do.	K		m	...	m	great numbers		Healthy
1899	... ♀ ad.	23.7.09	17 (approx.)	Sutherland	Found sick		...	...	...	p		Tumour from shot wound
1900	♂	31.7.09		Surrey (Frimley)	Found dead		large numbers	...	...	a		
1901	... ♀ juv.	28.7.09		do.	do.		...	...	...	great numbers		Skull fractured
1902	D ♀	30.7.09	15 (approx.)	Derby	do.		...	...	...	v		Bad case of worms
1903	...juv.	29.7.09		Inverness	Found sick		...	...	...	...		
1904	...juv.	5.8.09		Argyll	Found dead						Worms—few	Coccidiosis
1905	...	3.8.09		Northumberland	K—suspicious							
1906	... ♀ juv.	20.8.09	11½	Surrey (Frimley)	Found dead		large numbers	...	...	o		
1908	I ♂	27.8.09	20¼	Yorks.	Found sick		v. a	o	v. a	innumerable	Part full	Worms disease
1909	... ♀ juv.	7.9.09	19½	Fife	K		o	v. a	a	o		Healthy
1910	H ♀	7.9.09	23	do.	K		...	...	...	a few	Empty	do.
1911	... ♂ juv.	16.9.09	15½	Yorks.	Found dead		...	f	...	f		Worms
1912	I ♀ ad.	16.9.09	...	Argyll	K—probably		a few	o	v	v		Oversitting and worms
1913	I ♀ ad.	17.9.09	14½	Yorks.	Found sick		...	...	...	...		Disease
1913a	I ♀ ad.	17.9.09	19	do.	do.		...	...	...	...		do.
1914	D ♂ ad.	21.9.09	15½	Wigtown			enormous masses	o	enormous masses	very large numbers	o	Worms—cæcal enteritis

No.	Sex.	Date.	Weight in oz. (Av.)	County.	Manner of death.	Skin preserved.	Hymenol.	Trichos.	D. urogalli.	Strongyl.	Crop sample.	Cause of death.
1915	… ♀ juv.	20.9.09	16½	Yorks.	K—sick		…	…	…	very few		Not much wrong—pricked
1916	I ♂	6.10.09	20¼	do.			some	o	some	crammed	All green *Calluna* tops	Worm disease
1917	I ♀ ad.	6.10.09	19	do.			o	o	o	crammed	*Calluna* seed heads and spiders	Disease
1918	D ♀	6.10.09	13¾	do.	Found dead		f	o	…	f	A few Blaeberry leaves	Disease—bumble knee, worms, shot or wounded
1919	… ♂ juv.	6.10 09	15½	do.	? K (plump)		…	…	a few	a few		Healthy—damaged head and neck
1920	H ♀	10.09	20½	Perth	? Found dead (very stale)		…	…	…	v. a		Pricked bird—not diseased
1921	♀	20.10.09	13½	Surrey (Frimley)						v		
1922	D ♀	18.10.09	16	Caithness	Found dead		a few		some	crammed anæmic		Worm disease—back bruised
1923	H ♂	10.09	20	Perth	do.					a good many		Pricked bird—healthy.
1924	♂	28.10.09		Surrey (Frimley)	do.					v		
1925	♂	1.11.09	21½	do.	do.							
1926*												
1927	I ♀	9.11.09	15½	Yorks.	Caught sick—		…	…	v	v	o	Cæcal enteritis

* Partridge.

APPENDIX E.

CONTENTS OF CROPS AND GIZZARDS OF GROUSE CHICKS.

MOOR No. 1.

CROP 1.

(35 to 40 days old.)

Heather tips.
Heads of *Juncus*.
2 small insects (*Homopteron* and ? *Cynipid*).

GIZZARD 1.

(35 to 40 days old.)

No insects.

CROP 2.

(35 to 40 days old.)

A few heather tips.
Portion of frond of bracken.

GIZZARD 2.

(35 to 40 days old.)

1 specimen of *Ornithomyia lagopodis*.

CROP 3.

(18 to 20 days old.)

Heather tips only.

GIZZARD 3.

(18 to 20 days old.)

No insect remains.

CROP 4.

(35 to 40 days old.)

5 tips of heather only.

GIZZARD 4.

(35 to 40 days old.)

Elytra of a beetle, undetermined.

CROP 5.

(35 to 40 days old.)

A few heather tips.
1 *Ornithomyia lagopodis*.

GIZZARD 5.

(35 to 40 days old.)

No insect remains.

CROP 6.

(28 to 30 days old.)

A few tips of heather.

GIZZARD 6.

(28 to 30 days old.)

2 specimens of *Ornithomyia lagopodis*.

MOOR No. 2.

CROP 1.

(28 to 30 days old.)

Heather tips.
Several heads of *Juncus*.
1 *Cyrtoma spuria*.
1 *Anthomyiid*.
3 legs of an undetermined insect.

GIZZARD 1.

(28 to 30 days old.)

No insect remains.

MOOR No. 3.

CROP 1.

(7 to 14 days old.)

Mostly tips of heather.
A few flowers of *Vaccinium.*
1 male of *Bibio ? lacteipennis.*

GIZZARD 1.

(7 to 14 days old.)

1 *Cyrtoma spuria.*
Eggs of a small insect.
Fragments of legs of a *Bibio.*
Crushed vegetable remains the greater part of the contents.

CROP 2.

(7 to 14 days old.)

Mostly tips of heather shoots.
1 female of *Ceratopogon sp.*
1 specimen of *Cyrtoma spuria.*
1 crushed *Molophilus ater.*

GIZZARD 2.

(7 to 14 days old.)

Fragments of leaves of heather.
Seeds, undetermined.
? Nematode worm.
Very minute fragments of insects.
Quartz fragments.

CROP 3.

(7 to 14 days old.)

Mostly tips of heather shoots.
2 or 3 flowers of *Vaccinium.*
Small dipteron, very broken, but probably a *Chironomus.*
Body of a male *Molophilus ater.*
Remains of 2 females of *Ceratopogon.*
Remains of 1 male of *Ceratopogon.*
Fragments of 1 male *Molophilus ater.*

GIZZARD 3.

(7 to 14 days old.)

Fragment of one of the *Perlidæ*— ? A small species of *Leuctra.*
Fragment of *Cyrtoma spuria.*
2 legs of *Cyrtoma spuria.*
Vegetable fragments, mostly leaves and tips of shoots of heather.

Crop 4.

(7 to 14 days old.)

Mostly tips of heather.
Fragments of male and female *Ceratopogon.*
Male *Molophilus ater.*
Fragment of male *Molophilus ater.*
1 *Cyrtoma spuria.*
1 *Braconid*, undetermined.
3 specimens of a Staphylinid beetle, undetermined.
1 small *Chalcid* or *Proctotrypid.*

Gizzard 4.

(7 to 14 days old.)

1 nearly entire *Perlid.*
Minute fragments, probably of *Corymbites.*

CROP 5.

(7 to 14 days old.)

A few tips of heather.
1 flower of *Vaccinium.*
1 male *Bibio (johannis* group).
1 *Empis* or *Rhamphomyia.*

GIZZARD 5.

(7 to 14 days old.)

Minute insect fragments, probably of a beetle.

CROP 6.

2 spiders, undetermined.
4 elaters, undetermined.
3 *Bibio*, undetermined.
2 *Anthomyiids*, undetermined.
1 small *Acalyptrate muscid.*
1 *Chalcid.*
1 dipterous fragment.
Heather tips.

GIZZARD 6.

Body and 2 loose Elytra of an elater.
Head and thorax of Elytra of an elater.
Many small fragments, undetermined.
Legs of ? *Bibio sp.*
Fragments of heather.

CROP 7.

(7 to 14 days old.)

1 male and 1 female *Molophilus ater.*
1 phytophagous beetle, undetermined.

GIZZARD 7.

(7 to 14 days old.)

Leg and wing of ? *Cyrtoma spuria.*
Fragment of larger wing and leg ?—An *Ichneumonid.*
Fragment of chitin, undetermined.
Femur of ? beetle.

CROP 8.

(20 to 28 days old.)

1 female *Empis.*
1 female *Molophilus ater.*
Small crushed insect, undetermined.

GIZZARD 8.

(20 to 28 days old.)

Abdomen and legs of female *Empis.*
Fragments of insects, undetermined.
Fragmentary small dipteron —? *Molophilus.*

CROP 9.

(7 to 14 days old.)

Empty. Very small crop.

GIZZARD 9.

(7 to 14 days old.)

Fragments of *Molophilus*, viz., legs, portions of wings, and tips of abdomens with male *genitalia.*

CROP 10.

(1 to 7 days old.)

No insect remains. Very small crop.

GIZZARD 10.

(1 to 7 days old.)

Absolutely empty.

CROP 11.

No insect remains.

GIZZARD 11.

1 or 2 fragments of insects, undetermined.

CROP 12.

(1 to 7 days old.)

56 specimens of *Molophilus ater.*

1 female *Rhamphomyia* — ? *albosegmentata.*

GIZZARD 12.

(1 to 7 days old.)

1 specimen of weevil, undetermined.

Innnumerable fragments of *Molophilus ater.*

CROP 13.

(1 to 7 days old.)

2 specimens of *Ceratopogon sp.*

GIZZARD 13.

(1 to 7 days old.)

Many indeterminable fragments of insects—? Coleopterons.

CROP 14.

(7 to 14 days old.)

1 specimen of *Diastata nebulosa*, Fln.

2 Staphylinid beetles — ? *Homalota sp.*

Small male *Limnobiid*, indeterminable.

Another fragment of same.

1 *Braconid*, undetermined.

1 male and 1 female *Ceratopogon.*

Leg of ? *Tipulid.*

GIZZARD 14.

(7 to 14 days old.)

A number of insect fragments—? Coleopterous.

CROP 15.

(1 to 7 days old.)

34 specimens of *Molophilus ater.*

1 *Braconid*, undetermined.

Portion of body of a chelifer.

GIZZARD 15.

(1 to 7 days old.)

A large number of fragments of *Molophilus ater*, chiefly portions of legs.

CROP 16.

(1 to 7 days old.)

Portions of 6 specimens of *Molophilus ater.*

Fragment of a *Homopteron*, possibly a *Psyllid.*

GIZZARD 16.

(1 to 7 days old.)

Minute fragments of wings, legs, etc., quite indeterminable.

CROP 17.

(7 to 14 days old.)

Heather tips only.

GIZZARD 17.

(7 to 14 days old.)

Crushed vegetable and insect fragments, quite indeterminable.

CROP 18.

(1 to 7 days old.)

Heather tips.

1 female *Molophilus ater.*

3 legs of a small *Limnobiid* ?

1 *Ichneumon*, undetermined.

GIZZARD 18.

(1 to 7 days old.)

Unrecognisable fragments of insects among a mass of crushed tips and leaves of heather.

CROP 19.

(7 to 14 days old.)

Tips of heather.

Leaves of *Vaccinium myrtillus.*

Remains of 3 specimens of *Nemoura sp.*

1 male *Molophilus ater.*

1 female *Ceratopogon sp.*

1 dipteron, undetermined.

GIZZARD 19.

(7 to 14 days old.)

A few small fragments of a *Perlid.*

Grits and fragments of heather.

CROP AND GIZZARD 20 (contents mixed).

(1 to 7 days old.)

Body of a female *Ceratopogon.*

Minute fragments of legs—? Coleopterous.

Fragment of wing, undetermined.

Grit and vegetable fragments.

CROP 21.

(1 to 7 days old.)

Heather tips.

About 50 specimens of *Molophilus ater.*

GIZZARD 21.

(1 to 7 days old.)

Crushed fragments of heather.

Fragments of legs, wings, etc., of *Molophilus ater.*

A few grits.

CROP 22.

(18 to 20 days old.)

Heather tips.

Over 100 specimens of *Molophilus ater.*

1 male *Dicranota bimaculata.*

1 female *Limnobiid*, undetermined.

GIZZARD 22.

(18 to 20 days old.)

Crushed fragments of heather.

A mass of fragments of legs and other parts of *Molophilus ater.*

CROP 23.

(1 to 7 days old.)

A few tips of heather.

GIZZARD 23.

(1 to 17 days old.)

Fragments of heather.

A few remains of some undetermined coleopterous insect.

CROP 24.

(1 to 7 days old.)

Tips of heather.

1 crushed male of ? *Rhypholophus sp.*

1 male of *Cyrtoma spuria.*

1 male of *Sphærophoria menthastri.*

? 1 *Dineura sp.*

GIZZARD 24.

(1 to 7 days old.)

Fragments of heather.

Many insect fragments, minute and indeterminable.

CROP 25.

(7 to 14 days old.)

Tips of heather.
2 flowering heads of *Erica sp.*
Unripe fruiting capsule of moss—? *Funaria.*
Small male *Chironomid*, undetermined.
Larva of a dipteron—? A *Limnobiid.*
3 males of *Ceratopogon sp.*
Female of *Ceratopogon sp.*
2 legs of a dipteron, undetermined.

GIZZARD 25.

(7 to 14 days old.)

A mass of crushed heather tips and numerous minute fragments of insects, quite indeterminable.

CROP 26.

(1 to 7 days old.)

Tips of heather.
4 males and 7 females of *Molophilus ater.*

GIZZARD 26.

(1 to 7 days old.)

Crushed fragments of heather.
Remains of insects, much crushed and indeterminable, including head of a beetle, fragments of legs, etc.

MOOR No. 4.

CROP 1.

(1 to 7 days old.)

2 small fragments of heather.

GIZZARD 1.

(1 to 7 days old.)

Fragments of heather.

CROP 2.

(1 to 7 days old.)

A few fragments of heather.

GIZZARD 2.

(1 to 7 days old.)

A few fragments of heather.

CROP 3.

(1 to 7 days old.)

Fragments of heather.

GIZZARD 3.

(1 to 7 days old.)

Fragments of heather.
A number of seeds, undetermined.
1 small spiny fragment, possibly the femur of some aquatic larva.

CROP 4.

(7 to 14 days old.)

Entire *Phalangid*, undetermined.
Entire *Anthomyiid*, probably a *Phorbia.*
3 fruits of *Empetrum nigrum* (green).
Portion of leaf of *Vaccinium myrtillus.*
Several tips of heather.
3 corollas of *Vaccinium.*

GIZZARD 4.

(7 to 14 days old.)

Crushed fragments of heather.
4 fruits of *Empetrum nigrum.*
Legs of *Phalangid.*
Specimen, in several fragments, of *Strophosomus lateralis.*
Several other minute fragments of insects, undetermined.

CROP 5.

(18 to 20 days old.)

Filled with tips of heather.
1 fruit of *Empetrum nigrum.*
1 head of *Juncus.*

GIZZARD 5.

(18 to 20 days old.)

Crushed fragments of heather.
Seeds, undetermined.
A few indeterminable fragments of insects.

CROP 6.

(20 to 28 days old.)

Tips of heather (chief contents).
Fragment of leaf of *Vaccinium myrtillus.*
Cæcilius sp.
1 female of *Platychirus manicatus.*
1 female of *Sphærophoria menthastri.*
Female of an *Ichneumonid*, undetermined.
? *Proctotrypid*, undetermined.
Fragment of an *Ephemerid.*
3 bodies and a head of *Strophosomus lateralis.*

GIZZARD 6.

(20 to 28 days old.)

Crushed fragments of heather.
1 Tineid moth, undetermined.

CROP 7.

(20 to 28 days old.)

Tips of heather.
Tips of flowering shoots of *Erica sp.*
Small Staphylinid beetle, undetermined.
1 male and 1 female of *Ceratopogon sp.*

GIZZARD 7.

(20 to 28 days old.)

Fragments of heather (chief contents).
Seeds, undetermined.
A few minute indeterminable fragments of insects.

CROP 8.

(20 to 28 days old.)

1 tip of heather.
Odd leaves of heather.
1 flowering head of *Erica*—? Heather.
About a dozen capsules of a moss.
Empty skin of some insect—? *Hemipterous.*

GIZZARD 8.

(20 to 28 days old.)

Very finely crushed remains of heather.
A few indeterminable fragments of insects.

CROP 9.

(20 to 28 days old.)

Heather tips only.

GIZZARD 9.

(20 to 28 days old.)

Very fine fragments of heather.

CROP 10.

(20 to 28 days old.)

Tips of heather (chief contents).
5 fruits of *Empetrum nigrum.*
1 much crushed *Limnobiid,* undetermined.

GIZZARD 10.

(20 to 28 days old.)

Finely crushed fragments of heather.
Seeds, undetermined.
1 specimen of *Sciara sp.*

CROP 11.

(28 to 30 days old.)

A few tips of heather (sole contents).

GIZZARD 11.

(28 to 30 days old.)

Finely crushed fragments of heather (sole contents).

CROP 12.

(18 to 20 days old.)

A few tips of heather (sole contents).

GIZZARD 12.

(18 to 20 days old).

A mass of finely crushed fragments of heather.
A few minute fragments of insects, quite indeterminable.

APPENDIX F.

EXPERIMENTS MADE UPON HAND-REARED GROUSE.

By Edward A. Wilson.

THE experiments of which an account is to be given in this chapter were conducted at St Catherine's, Frimley, where, upon a tract of heather, the Committee had reared a considerable number of tame Grouse.[1]

Observation area.

A stage in the Inquiry had been reached, at which it became imperative to practically demonstrate the cause of "Grouse Disease." For this purpose certain healthy birds were infected. Care was taken to infect the smallest number necessary for the success of the experiment.

Artificial infection.

The attempt to infect hand-reared Grouse with "Grouse Disease" by contaminating their food and water with the larvæ of the *Trichostrongylus pergracilis* was for some time unsuccessful; but as it led to a far more complete knowledge of the life history of the nematode in question, and of the manner of its admission to the Grouse, the initial failure, which lasted over a period of some months, ultimately contributed to the final success.

Experiments at first unsuccessful.

The Grouse, twelve in number, were from one to two or three years old, and all of them had been hand reared, either from the eggs of wild birds picked up on the Grouse moor, or from eggs laid in captivity at Frimley.

Birds subjected to experiment.

For the purpose of the experiments, it was necessary to arrange a smooth flooring to the coops or runs in which the birds were confined, so that the collection of every portion of the dejecta was made possible. The board floors were built with care, and made smooth and close-fitting to the run. There was thus no possibility of losing any part of the droppings, and the floor was left clean after each observation.

Flooring of coops.

---

[1] *Vide* chap. xxii. p. 483.

Cæcal dejecta.

The amount of cæcal dejecta, *i.e.*, the softer pasty matter which is passed from the cæcum directly after the harder dropping, varied considerably from day to day. As a rule, the health of the bird was obviously better when the cæcal dejecta was very abundant. When a bird was sick and moping, the cæcal dejecta was often greatly reduced in quantity.

(1). Experiments on Grits.

One of the objects of the experiments was to learn something of the method of passage and the use of the grits which are normally in the gizzard of the Grouse.

Grit starvation.

On 17th October two healthy Grouse cocks A and B were enclosed separately in wire runs with boarded floors, and were given no stony grits.

Effects of different diets.

Blackberries.

On the tenth day of grit starvation both birds were given the opportunity of eating ripe and half-ripe blackberries, as only two or three grits per day were being passed. It was thought that the hard pip of the blackberries might increase the rate of loss of the stony grit, as it often appears to do in wild birds (*see* chapter iv. pp. 98-99). The opportunity was continued for five days, but neither of the birds would eat the berries.

Dari.

As the birds were being fed on dari, a search was made to discover whether any whole seeds were passed unbroken suggesting the want of stony grit to break them. But no unbroken seeds were found, so it was safe to conclude that at this, the twelfth day of grit starvation, sufficient grit remained in the gizzard to grind up the seed. The pieces of rice and dari in the dejecta were always small and hard, but not powdered, and probably a good deal passed thus undigested. The heather seemed to be sufficiently broken up and digested even after twelve days of abstinence from grit.

The droppings of both birds were at this time formed always of well-teased heather fibres, and rice and grain remnants. No whole grains were passed, and when castor oil was administered there was no increased loss of stony grits.

The question then arose as to the amount of grit remaining to deal with the food which was being eaten. It seemed probable that the larger pieces of grit were being retained, and were sufficient for a certain definite and reduced amount of work and no more; hence the insufficiently digested fragments of rice and dari grain. In the wild bird old age is often indicated by the size and wear of the grains of quartz in the gizzard. For example, an old cock will have some small pieces, but a far greater number of smooth-worn large pieces.

On October 2nd the droppings continued to show that the food was broken up, both dari, rice, and heather shoots, but not in all cases sufficiently for complete digestion.

On October 3rd all seed and grain food was cut off, and only heather and green food were allowed to A and B.

Cranberries which were given both whole and chopped in pieces were not touched.

Heather and green food.

On October 5th birds A and B were being fed on heather and green food only, and they began to pass far more bulky and well-formed droppings, amounting to a third more than before, and of larger calibre.

Death of first bird B.

The bird B, a young cock Grouse, died on October 7th after having survived complete abstinence from stony grits for twenty-one days.

Post-mortem results.

The *post-mortem* examination of this bird showed no immediate cause for death, and no really pathological change except some inflammation of the cæca, and some Coccidiosis. A great many coccidia were found in the duodenum, stomach, and cæca, as well as in the main gut. The pancreas was hyperæmic and congested, as was also the intestine. But the Coccidiosis did not seem sufficiently severe to have caused death alone.

All the other organs, heart, lungs, and spleen, liver and kidneys were normal. The gizzard, however, was very small and very horny within, the lining being more resistant than in any old, wild bird. The organ still contained a good deal of grit and food.

Conclusions.

Death must have been accelerated by the diminished digestion and absorption of food which resulted from the reduced intake, for the bird's appetite appeared to keep pace with its capacity for grinding food up in the gizzard. This is a point which bears upon the conditions affecting a wild bird in time of heavy snow. Then the Grouse probably undergoes an involuntary grit starvation, resembling that of the above experiment. But the conditions would be worse, for the bird would have less food to choose from, and certainly less soft food to eat.

It appears from the experiment that when a Grouse is fully supplied with food and grit, much grit is picked up, and much is passed through the bird each day. The ejected grit consists chiefly of the smaller pieces and of the sand which have been formed partly from the rubbing together of the smaller sharp, edged bits.

If, however, whilst maintaining the same food supply, the grit is suddenly cut off, the gizzard, having no more small pieces and no more sand to pass, will not, on that account, allow the larger pieces to pass. These are retained, and it is only by an accidental passage through the sphincter of the gizzard that a few particles of grits of any size can make their appearance in the intestine lower down, and eventually in the excreta.

Larger and rather smoother grits are required for permanent use, and these are evidently retained and used for a long period; hence the smooth, worn, and comparatively big grits in the gizzard of an old Grouse. Smaller, rougher grits are required for immediate use, and are constantly being swallowed, and as constantly passing through, and being replaced by a fresh supply.

After a snowfall, when all but the roughest and most woody foods are buried out of sight, and no grits can be obtained, the Grouse must starve to some extent, for it is quite conceivable that without the sharp edges of the smaller freshly collected grits the rounder sides of the older and larger grits make but little impression upon the woody fibres of old, dry heather such as alone remains exposed after a heavy snowfall. This is the time when a clearance or two here and there to expose a roadside "scrape" or gravelly bank will make a great difference to the conditions of life for the Grouse. Given grit they can manage to subsist on poor food, but given no grit they will wander in search of it and starve if they do not find either more grit or much softer food.

Marked grits.

Several questions remain still to be answered in this connection, owing to the fact that the two birds experimented upon refused to eat berries with hard seeds, and also refused to eat grits which could be recognised afterwards such as garnets. Samples of these stones were counted and then thrown in amongst the food; but they were never taken as grits. It is hard to say why they should have been refused, for they were small, and hard and rough and of the same character as the ordinary quartz eaten by the Grouse in nature. The colour alone differed; but the colour of grits in a Grouse's gizzard varies sufficiently to show that this could not have been the reason for their rejection.

Broken glass beads of various recognisable colours were also tried, but left untouched, thus making the problem of admitting recognisable grits a difficult one.

Coloured glass.

With a scarcity of grit soft food is eaten with greater appetite than harder food, hence if corn is put out for Grouse in the winter as an extra feed the greatest care should be taken that the birds have equal opportunities for supplying themselves with grit. If not they will not use the corn at all, or if they do it will do them as much harm as good.

Grit necessary with hard food.

Woody seeds undoubtedly bring about a loss of the larger and more permanent grits in the gizzard, and although for a time the seeds do the gizzard's work they cannot permanently take the place of the stony grits.

Woody seeds.

In both birds experimented upon even after a grit starvation of twenty-one days in one case, and of forty-three days in the other, there was still enough quartz grit in the gizzard to grind up dari and rice grains, as well as to some extent, heather stalks, but the last named were not really sufficiently crushed for proper digestion.

Castor oil produced purging but no loss of gizzard grits, so the probability is that the mechanical assistance of hard foreign bodies like hard seeds simulating grits will always be found the most efficient agent in removing grits from the gizzard.

TABLE OF DAILY OBSERVATIONS MADE UPON GRITS PASSED BY (A) DURING GRIT STARVATION.

Grouse A. was a healthy cock Grouse, two years old.

1908		Weight in ozs.	
Sept.	17	25	Was put on board flooring, and was fed only on dari, rice, and heather. No grits or gravel of any kind was given. The droppings were collected and washed for grits daily. First day, quite one hundred small pieces of quartz and flint and a lot of sand were passed.
,,	18	...	The hard formed droppings, when powdered, just filled a dipping glass (4 × 1½ inside measurement). About thirty small grits of quartz and flint were passed, and much that was like sand, either the result of attrition in the gizzard or picked up with seeds, etc. from the peaty soil before the experiment was begun.

1908		Weight in ozs.	
			Cæcal droppings scanty, but entirely free from nematode or cestode eggs or worms. There were, however, some coccidian spores present.
Sept.	19	23	Very few grits were passed, about eight small bits and a good deal of quartz sand.
,,	20	24	Passed seventeen pieces of quartz and flint all small and rough, except two or three which were larger and worn.
,,	21	23¾	Appetite failing, and droppings less in quantity and smaller in calibre. Was given dari, rice, and fresh pulled heather daily. About fifteen small grits passed.
			Cæcal droppings were examined daily. Coccidia spores only were found. There were no ova of *Trichostrongylus*.
,,	22	...	Wet weather. Cæcal excreta more abundant. Only fourteen or fifteen small grits were passed.
,,	23	22¾	Five small grits were passed.
,,	24	24	No grits were passed.
,,	25	23¾	Two grits were passed.
,,	26	23¼	No grits were passed.
,,	27	24	Blaeberry leaves given to-day. Seven grits were passed, all small.
,,	28	23½	Ten grits were passed, all of fair size except three or four.
,,	29	23½	Three small grits were passed.
,,	30	23	Three small grits were passed.
Oct.	1	23	Three grits were passed. Gave red cranberries, but none were eaten.
,,	2	22¾	Three small grits were passed.
,,	3	22¾	No grits were passed. Droppings became reduced in quantity much less than those of the companion bird B.
,,	4	22¼	One small grit was passed.
,,	5	23	Twenty-five small grits were passed.

1908		Weight in ozs.	
Oct.	6	22	One small grit was passed.
,,	7	22¼	Ten small grits were passed.
,,	8	22	Twelve small grits were passed. Gave dari and rice again with twenty garnets.
,,	9	22	No garnets eaten. No grits were passed.
,,	10	22½	One small grit was passed.
,,	11	22½	No grits were passed. Still no garnets eaten.
,,	12	22¼	No grits were passed.
,,	13	22¼	One grit was passed.
			Healthy birds were now passing three or four times as much of the cæcal droppings as A, suggesting that much less than the normal quantity of food was being eaten by A.
			Tried A with broken glass, coloured green, and simulating quartz.
,,	14	22¼	One grit was passed. Gave A yellow glass, took away the green, which had not been touched.
,,	15	21¾	No grits were passed.
,,	16	21¾	Five small grits were passed.
,,	17	21	Removed all the glass. Twelve small grits were passed.
,,	18	21¾	No grits were passed. Gave white glass beads.
,,	19	21½	Fifteen grits were passed, all very small. Cleaned away all the glass, none had been taken.
,,	20	22¼	Fifteen grits were passed, very small, almost like sand.
,,	22	22½	Three grits were passed, very small.
,,	24	22½	
,,	28	22¼	
,,	30	22	

This experiment then came to an end. No more droppings were collected. The bird had lost something like 3 ounces of weight in forty days of starvation from grits, but with abundance of food.

More than half of the whole grits passed in those forty days was passed on the first day.

The total amount of grits passed in the forty days equalled half the amount of grits found normally in a healthy Grouse cock's gizzard.

TABLE OF DAILY OBSERVATIONS MADE UPON GROUSE (*B*) UNDER GRIT STARVATION

Grouse (*B*) was a healthy cock Grouse, hatched four months before the experiment, and well grown.

1908	Weight in ozs.	
Sept. 18	14¾	Was put on board flooring, being fed only with dari, rice, and heather, but with no grits or gravel of any kind. (*B*) passed about twice as much of the solid dejecta as (*A*) during the first twenty-four hours, also passed quite one hundred and sixty grits, all small except about twenty, and a lot of sand. Examined cæcal dejecta and found no trace of *Trichostrongylus* in it, neither eggs nor worm larvæ of cestode or nematode, but a number of coccidian spores were present as usual.
,, 19	15	Twenty-seven small grits were passed. Very little of the grit was larger than coarse sand.
,, 20	15	Thirteen small grits were passed.
,, 21	14¾	Two small grits were passed. The droppings were more scanty and smaller in calibre. The bird's appetite was apparently failing; gave dari, rice, and fresh heather daily, but no grits. Examined cæcal droppings daily, found no nematode larvæ or ova, but numbers of coccidia.
,, 22	15¼	Nine small grits were passed.
,, 23	15	Two small grits were passed.
,, 24	15	Two small grits were passed.
,, 25	15	Three small grits were passed.
,, 26	14	Three small grits were passed.
,, 27	14½	Ten small grits were passed. Blaeberry leaves were given to-day and more grits were passed.
,, 28	15	Twelve small grits were passed.

1908		Weight in ozs.	
Sept.	29	15¼	Three small grits were passed.
,,	30	14¼	Seven small grits were passed.
Oct.	1	15¼	Two small grits were passed. Gave red cranberries, a numbered quantity, which were not eaten, with the dari, rice, heather, and blaeberry plants.
,,	2	15	Five grits were passed.
,,	3	15¼	Two grits were passed. Gave castor oil.
,,	4	14	Three grits were passed. No more grits than usual, though the motions were very loose, but cæcal and ileal, in consequence of the castor oil. The bird was weak and unwilling to move. Coccidian spores passed in large numbers.
,,	5	14	Seven grits were passed.
,,	6	12½	Six grits were passed.
,,	7	12	After death. Three grits were passed.

Death occurred after three weeks' abstinence from grit, and the amount of grit remaining in the gizzard was just about equal to the amount lost and collected during the period of the experiment.

This bird had therefore lost 2¾ ounces of weight in exactly twenty-one days, and had then died, partly perhaps of Coccidiosis, and partly of the result of grit-starvation. The amount of grits passed the first day was again more than half what was passed during the remaining twenty days, in fact very nearly two-thirds. All the grits passed were found in the harder formed dropping, never in the cæcal drooping. Only once in a sick bird has grit ever been seen by us in the cæcum.

That two birds should have passed so great a quantity of grits on the first day of an experiment of this kind may at first seem accidental, and unreliable as an observation.

So three other Grouse were put each on a board floor, and their excreta collected and washed out to make certain that the normal output of grits was as great as it seemed to be. In each case it was so, and this means that a healthy Grouse with an abundant supply of food and quartz grits, passes between a quarter and a third of the contents of its gizzard every day, but that the amount which is passed consists chiefly of the smaller pieces and the sand.

Experiment repeated on fresh Grouse.

(2).—EXPERIMENTS ON ARTIFICIALLY INFECTING BIRDS WITH *TRICHOSTRONGYLUS*

Artificial infection with Strongyle worm.

Centrifugal treatment of heather.

After the completion of the experiments in grit starvation, attention was turned to the possibility of infecting birds artificially with *Trichostrongylus pergracilis*, the active agent in "Grouse Disease," and to the discovery of the method by which this infection is effected in nature. It was obvious that no wild Grouse escaped infection, and already at Beauly Dr A. E. Shipley had, by soaking some heather in water and centrifuging the residue, thrown light upon the method of infection.

This experiment was therefore carried out on a considerable scale, and eventually the process of infection became clear. In the chapter written by Dr Leiper, the details of the early life history of the larval *Trichostrongylus* which plays so important a part in the Grouse infection, will be found fully described.

Having begun the investigation by centrifuging the washings of some heather which had been used for packing a brace of birds in a game box, and having discovered living microscopic larval nematodes in it, which appeared to be true larvæ of *Trichostrongylus*, it was decided to make a further and more systematic examination of heather from all parts of the country.

Analysis of heather samples.

Samples were obtained and examined from a great variety of Grouse moors at various heights and in different counties, and it at first appeared as though it would be impossible to obtain a sample of heather which did not carry upon it the larvæ of these threadworms, and therefore the possibility of infection, disease, and death.

Larval nematodes, many of them closely resembling the larval *Trichostrongylus* in appearance, were to be found in every handful of heather picked between Land's End and the Shetlands.

That Grouse were unknown in the area from which the heather often came, as, for example, from Dorsetshire, appeared at first sight to make no difference whatever to the wealth of young nematodes, but gradually it was realised that the great majority of the larval worms were entirely unconnected with disease, and were really free living and not parasitic nematodes.

Experimental feeding.

Birds were then chosen out at Frimley for experimental feeding with food and water contaminated by the centrifuged residues of the washings of heather from several selected moors.

Further cultures were made also of the *Trichostronglyus* larvæ hatched from the ova passed in the cæcal excreta of infected birds.

Larval cultures.

No difficulty was experienced in obtaining these. The cæcal dejecta full of ova, having been placed in water, produced a very large number of larval worms actively moving in the water within a day or two. But the difficulty was to keep these larval worms alive and growing for a sufficient length of time to enable them to undergo their proper metamorphosis.

It was at this point in the inquiry that Dr Leiper was called in to assist the Committee with his special knowledge of Helminthes.

Failure of earlier experiments.

Cultures of early *Trichostrongylus* larvæ had already been administered to birds in which there were no nematodes, but without any result; and the reason of this was soon discovered by Dr Leiper, who showed that up to a certain stage in its metamorphosis the larval *Trichostrongylus* could be swallowed in any numbers by a Grouse without any ill effect. The proper metamorphosis occurred a variable number of days (sometimes eight and sometimes as many as seventeen days) after hatching from the egg, and until this metamorphosis had taken place the larval *Trichostrongylus* would be simply digested or passed through the intestine of the Grouse.

Metamorphosis of larvae.

This metamorphosis is described fully by Dr Leiper, who gives a complete account of the development and life history of the *Trichostrongylus pergracilis*,[1] while its anatomy has been described by Dr A. E. Shipley.[2]

Description of experiments.

It remains here to explain how the experiments were carried on at Frimley, by which these views were confirmed, and by which the theory of "Grouse Disease" held by the Committee was shown to be the true one.

Early experiments.

The first unsuccessful experiments were made on three young Grouse, (*M*) (*P*) and (*S*) of the year, *i.e.*, of about four months old.

(*M*)—Weight 15½ ozs.
(*P*)—Weight 16½ ,,
(*S*)—Weight 16 ,,

Oct. 9th.—The droppings of these three birds were carefully examined and were all found to be wholly free from *Trichostrongylus* and from other nematodes and from cestode worms, so far as could be ascertained by examination of the droppings, which in an infected bird almost invariably carry the ova of these worms.

---

[1] *Vide* vol. i. chap. x. p. 224.

[2] *Vide* vol. i. chap. x. p. 207.

Oct. 10.

(*M*)—Weight 14½ ozs.
(*P*)—Weight 16 ,,
(*S*)—Weight 16 ,,

The droppings were again examined with no discovery of nematodes or cestodes.

Gave to (*M*) some centrifuged heather washings containing a large number of active and quiescent larval nematodes.

Gave to (*P*) some concentrated culture of larval *Trichostrongylus pergracilis*, taken from the dejecta of an infected Grouse, and recently prepared, not more than three days before, from very active worms.

Gave nothing to (*S*), which was to be kept as a control.

Oct. 12.—Examined cæcal excreta of all and found nothing.

(*M*)—Weight 14¾ ozs.
(*P*)—Weight 16½ ,,
(*S*)—Weight 17¼ ,,

All were fully infected with Coccidiosis, as the number of spores in the dejecta clearly showed.

Oct. 13.—Examined cæcal excreta with no result.

(*M*)—Weight 15¼ ozs.
(*P*)—Weight 16¾ ,,
(*S*)—Weight 16¾ ,,

The following weights were taken with the hope that some loss would show itself as the infection became established.

But no infection took place. Nevertheless, as a series of daily weights showing daily variations, due presumably to food, they are not altogether without interest, and are therefore given.

	(M) Weight in ozs.	(P) Weight in ozs.	(S) Weight in ozs.
October 14 . . .	15½	17	17
,, 15 . . .	14¾	16¾	16¾
,, 16 . . .	15½	16¾	17½
,, 17 . . .	15	17	16½
,, 18 . . .	15¼	16¾	17
,, 19 . . .	14	16¼	17¼
,, 20 . . .	16	17¾	18¼
,, 22 . . .	14½	16	16¾
,, 24 . . .	16½	18	18½
,, 28 . .	15¾	17¾	18¼
,, 30 . . .	15½	17½	18¼

Thus day by day the weight of each bird was taken, and its cæcal excreta, collected from the clean board floor, were examined without the discovery of a single *Trichostrongylus* ovum.

Even on November 5th, when the excreta were again examined, neither of the birds had become infected. This was a month after exposure to what was then believed to be infection.

M. might have been infected by the heather washings.

P. might have been infected by the larval *Trichostrongylus*.

S. was a control, and would have remained unaffected.

New method of infection.

It was at this point that Dr Leiper suggested a new plan for experimental infection, but it was not put at once into execution, as the difficulties of keeping cultures of *Trichostrongylus* larvæ alive were not yet completely overcome. Almost every culture died off before complete metamorphosis had taken place, chiefly on account of the difficulty of feeding the larvæ, and yet avoiding decomposition in the food. In pure water they always died.

The following experiments were therefore made later.

Briefly, they can be summarised as follows, the notes referring to weight, dosage, and temperatures being given in greater detail below.

Of three adult Grouse purposely infected with Strongylosis, two died of marked Strongylosis. One, still living in May 1910, proved very resistant, although infected slightly.

One adult Grouse accidentally infected with *Trichostrongylus* died with marked signs of Strongylosis.

Of six young Grouse purposely infected with *Trichostrongylus*, two were killed accidentally, one of which gave no result, but the other was distinctly infected with Strongylosis. One died of marked Strongylosis. One died markedly infected with Strongylosis. Two are still living, May 1910.

Of four young Grouse purposely infected with coccidia, one died and three were killed, all four showing Coccidiosis.

Of three young Grouse accidentally infected with coccidia, all died showing marked signs of Coccidiosis.

GROUSE (*A*), ADULT ♂, ONE YEAR OLD.

	Ozs.	Temperature.	Dosage.	
		Degrees.		
June 19, 1909	...	...	1st dose	Fresh culture (Metamorphosis doubtful.)
,, 23, ,,	17	...	...	... ...
,, 26 ,,	15	...	2nd dose	Culture, twenty-three days old. Bird looks fit.
July 1, ,,	...	...	...	Shows unfertilised ova in droppings—first time. There is a very slight infection with coccidia in this bird.
,, 3 ,,	...	...	3rd dose	Culture, thirty days old.
,, 8 ,,	12	...	none	Died, and was examined by Dr Leiper.

"Tissues preserved. Also complete lung showing discoloration that may be 'pneumonic,' but the cæca were intensely injected with a good deal of blood in cæcal contents. Rectum full of chalky fluid. The intestines seemed normal. Spleen was enlarged, this I also pickled."—R. T. L.

"I had a look over sections of the lung and found some of the culture in the bronchioles. The cæcal condition remains the same, even though we ultimately decided that death was due to the culture in the lung."

"*Trichostrongylus* in this case required at least seventeen days outside the body, a very much longer time to arrive at the stage of development necessary for infection than analogy would lead one to expect."—R. T. L.

"I notice that in the warm weather complete metamorphosis is accomplished in eight days."—R. T. L.

GROUSE (*B*), ADULT ♀, ONE YEAR OLD.

	Ozs.	Temperature.	Dosage.	
		Degrees.		
July 17, 1909	...	...	1st dose	Culture, forty-four days old. This bird was kept on the same ground, self-infected, throughout.
,, 23 ,,	17	...	2nd full	Culture, fifty days old.
Aug. 6 ,,	15¾	...	none	... ...
,, 10 ,,	15	...	3rd dose	Culture, seventy days old. Examined, and found to contain living sheathed worms, though not very many.
,, 20 ,,	15	...	4th dose	Cæcal droppings—very full of *Trichostrongylus* ova—used for making culture, August 23rd.
,, 28 ,,	15	...	5th dose	Culture made on August 6th, pretty good, twenty-two days old.
Sept. 4 ,,	14¾	104·1	6th dose	Same culture, thirty days old. Cæcal droppings very full of *Trichostrongylus* ova.
,, 11 ,,	13½	...	none	Very weak.
,, 18 ,,	13½	106·4	none	Very weak. One or two ova in every one-sixth of field.
,, 29 ,,	...	...	none	Salt was put within reach and a little salt also in its drinking water. On board floor.
Oct. 7 ,,	11¾	...	none	The bird died and was examined by Dr Leiper.

Weight lost, 5¼ *ounces in eighty-three days.*

"The cæca were thin and contained very moderate amount of fæces. I should say they were partially empty. No sign of mucus or other accumulation. The walls were very thin and there were numerous *Trichostrongylus pergracilis*. The contents showed large numbers of eggs. The mucosa of the cæca did not show any petechial spots or appear to be congested, but this may have passed off. The mesenteric veins were not dilated. Lungs showed *post-mortem* staining."—R. T. L.

GROUSE (*C*), ADULT ♂, ONE YEAR OLD.

	Ozs.	Temperature.	Dosage.	
		Degrees.		
July 17, 1909	...	...	1st dose	Full dose of forty-four days' old culture.
,, 23 ,,	18	...	none	This bird is kept on same fouled ground all through to end of experiment.
Aug. 6 ,,	19	...	none	... ...
,, 10 ,,	19	...	2nd dose	Used a culture seventy days old, in which were moving sheathed worms.
,, 11 ,,	...	...	...	Examined cæcal excreta. No *Trichostrongylus* ova and very few coccidia.
,, 20 ,,	19¼	...	3rd dose	A full dose of August 6th's best culture.
,, 28 ,,	19	...	4th dose	Same culture used, twenty-two days old.
Sept. 4 ,,	19¾	106·2	5th dose	Used centrifuged culture of August 6th, now twenty-nine days.
,, 11 ,,	19	...	6th dose	Used very old culture with living sheathed worms. The bird is strong and well.
,, 18 ,,	19	106·2	7th dose	A very full dose of metamorphosed worms, made (*B*) August 23rd. Cæcal excretion contains still only a few ova, one or two ova in one inch field. A very few coccidia.
Oct. 15 ,,	20	104·4	none	Cæcal excreta—a uniform but spare infection, not more than one or two to the one-inch field.
,, 23 ,,	...	107·7	8th dose	Culture of September 14th. Cæcal excretion show two or three ova in one-inch field certainly more than before.
,, 27 ,,	20	105·2	9th dose	Full dose of September 14th, culture. Living and metamorphosed worms in considerable quantity. Still strong and brisk and very lively.
Nov. 13 ,,	19¾	107·3	...	... ...
May 17, 1910	18½	...	...	(This was the last visit I made to Frimley.) Examined cæcal excreta and found a good many *Trichostrongylus* ova and a number of coccidia sporulating.

The bird, now two years old, is small, but looks well, and in good feather. Has mated with two hens this season, both now laying.

This young cock has proved himself to be extraordinarily resistant to infection, compared with the young hen (*B*), which died in less than twelve weeks, after six doses of culture. This bird is still quite healthy, though dosed nine times with similar cultures, and kept on the same ground all the while for auto-infection.

Even now it is not at all heavily infected, and has hardly lost any weight.

Grouse (*d*), Chick ♀.

	Ozs.	Temperature.	Dosage.	
		Degrees.		
June 12, 1909	...	...	...	Hatched out.
,, 19 ,,	...	...	1st dose	Doubtfully metamorphosed culture.
,, 26 ,,	...	...	2nd dose	Culture of twenty-three and twenty-six days mixed. Looks weak and moping.
July 3 ,,	...	...	3rd dose	Culture of thirty days.
,, 9 ,,	...	...	4th dose	Same culture—now thirty-six days. Some worms active—most quiescent.
,, 17 ,,	...	...	5th dose	Same culture—now forty-four days.
,, 23 ,,	...	...	none	Chick looks very sickly.
,, 28 ,,	...	...	none	Chick died and was examined. Its skull was broken—clot over brain. Probably pecked and killed.

Proximal end of each cæcum, about half the length, was abnormally translucent, pale, and fatty in appearance, with injected vessels. No redness of mucosa within any part of gut, but *very* abundant *Trichostrongylus* and ova. No coccidia in cæcum; a few only in duodenum.

Grouse (*e*), Chick.

	Ozs.	Temperature.	Dosage.	
		Degrees.		
June 28, 1909	...	...	...	Hatched out—one of five of "Lassie's." No coccidia in cæcal excreta before July 9th.
July 9 ,,	...	...	1st dose	Pill of rich coccidian cæcal paste.
,, 17 ,,	...	...	2nd dose	Same dose.
Aug. 6 ,,	5¼	...	3rd dose	Fed with coccidia from (*c*). Two untreated controls weigh 5¼ and 5¾ ounces respectively, being members of same family—(*d*) and (*f*)—treated as (*e*)—weigh 4 and 4¼ ounces.
,, 10 ,,	6	...	4th dose	Same dose.
,, 20 ,,	7½	...	none	...
,, 28 ,,	9	...	5th dose	Used coccidia from Frimley bird.
Sept. 4 ,,	9	105·3	...	Again used coccidia from Frimley, Yorkshire bird. The chick looks sick and is throwing "white-wash" for the first time.
,, 5 ,,	...	...	none	Died, and was sent to Dr H. B. Fantham. Sixty-nine days old. Fifty-eight days after first infection.

GROUSE (*g*), CHICK.

	Ozs.	Temperature.	Dosage.	
		Degrees.		
June 22, 1909	...	...	...	One of two chicks—hatched.
Aug. 6 „	...	...	1st dose	Fed with coccidia from (*c*).
„ 10 „	8	...	2nd dose	Do. Do.
„ 20 „	10	...	none	... ...
„ 28 „	12	...	3rd dose	Again fed with Frimley Yorkshire birds' coccidia.
Sept. 4 „	14¾	105·8	4th dose	Do. Do. Do.
„ 11 „	...	...	none	... ...
„ 18 „	16	105·4	5th dose	Gave three pills of coccidia sent by Dr Fantham.
Oct. 15 „	...	...	none	Was sent *alive* to Dr Fantham. Looked well, but was decidedly small and undersized.

"Was, I think, anæmic, but showed practically no coccidia—nor worms in its gut, only few spores."—H. B. F.

GROUSE (*h*), YOUNG BIRD ♂.

	Ozs.	Temperature.	Dosage.	
		Degrees.		
Aug. 10, 1909	18	...	1st dose	Mixture of cultures—*Trichostrongylus*.
„ 20 „	18¾	...	2nd dose	August 6th best culture.
„ 28 „	18½	...	3rd dose	Same culture, August 6th.
Sept. 4 „	19¾	105·8	4th dose	Same culture centrifuged.
„ 11 „	20½	...	5th dose	Culture of July 30th.
„ 18 „	21½	104·7	6th dose	Full dose of culture from (*B*) of August 23rd. (*i*) and (*j*) in same coop were first dosed.
Oct. 15 „	...	...	none	Examined cæcal excreta from the coop (three birds). Two samples were considerably infected; the third was infected, but slightly.
„ 23 „	...	...	none	Examined cæcal excreta; again nothing further.
„ 27 „	20	106·4	7th dose	Full dose of September 13th culture.

Grouse (*i*), Young Bird ♂.

	Ozs.	Temperature.	Dosage.	
		Degrees.		
Sept. 18, 1909	23	105·2	1st dose	Culture of August 23rd from (*B*)—*Trichostrongylus.*
...	...	...	...	This bird is in coop with (*h*) and (*j*). One bird is not infected, as proved by examination of cæcal droppings to-day, though one bird is very lightly infected as yet.
Oct. 15 ,,	...	...	none	Examined cæcal excreta, found ova in all three.
,, 23 ,,	...	...	none	Do. Do. Nothing further.
,, 27 ,,	22¼	106·8	2nd dose	Full dose of September 13th culture.

Grouse (*j*), Young Bird ♂.

	Ozs.	Temperature.	Dosage.	
		Degrees.		
Sept. 18, 1909	21½	106·0	1st dose	Culture from (*B*) August 23rd, *Trichostrongylus.* Examined cæcal excreta, found no worms.
Oct. 15 ,,	...	...	none	Examined excreta, three samples, all infected. Bird looks well.
,, 23 ,,	...	...	none	Do. Do. Nothing further.
,, 27 ,,	19¾	107·4	2nd dose	Full dose of September 13th worms.

UNFINISHED EXPERIMENTS.

(*c*) Chick—one of five hatched June 12th, 1909. Was dosed on June 19th with worm culture, and accidently killed—broken leg—two days later.

(*d*) and (*f*) Chicks, hatched with three others on June 28th, were dosed with coccidia on July 9th; previously proved free of spores in excreta; again dosed with coccidia July 17th.

Were taken alive to Cambridge by Dr Fantham, August 6th, showing effects of Coccidiosis, in poor health and retarded growth; their weights 4 ounces (*f*) and 4¼ ounces (*d*) as compared with two controls of same family, which were untreated, 5¼ ounces and 5¾ ounces.

(*e*) Died of Coccidiosis on September 5th, *i.e.*, fifty-seven days after commencement of treatment.

(*D*) Adult ♂—October 27th, 1909—was given a solution of common salt, one dose of which killed this healthy bird in thirty-six hours.

(*E*) Adult ♂—October 27th, 1909. Very sick with Strongylosis. Was given same dose of salt as above, and died in twenty-four hours.

UNTREATED BIRDS—ACCIDENTALLY INFECTED

1. No 16. A Grouse chick of Family (*A*) kept as control—no treatment. Hatched out June 12th, 1909.

Died July 8th, 1909, "with intense Coccidiosis and marked congestion of cæca. I did not find any parasitic worms."—R. T. L.

This was a case of natural infection at Frimley, Surrey.

2. Young Grouse of the year. Died without treatment and was sent to Dr Fantham at Cambridge, August 22nd, 1909.

"Cæcal contents very fluid — no worms — Coccidiosis without a doubt. Cæca crowded with cysts. No Strongylus or ova. No tapeworms. Epithelium much degenerated."—H. B. F.

This was also a case of natural infection at Frimley.

3. Young Grouse of the year. Died without treatment, and was sent to Dr Fantham, August 22nd, 1909.

"Same report. No Strongylus found but some ova. Cæca crowded with coccidia. No tapeworms. Certainly died of Coccidiosis. Epithelium much degenerated."—H. B. F.

4. Young Grouse of the year. Died without treatment and was sent to Dr Fantham, August 22nd, 1909.

"No Strongylus or ova. Tapeworm present. Crowded with coccidia. Certainly died of Coccidiosis. Cæcal contents, fluid and hæmorrhagia. Epithelium much degenerated."—H. B. F.

5. Young Grouse ♀. Died without treatment; was a bird of the year. Sent from Yorkshire, August 20th, 1909. Died. 11½ ounces, very thin. Hæmorrhagic fluid contents of cæcum made up of coccidia spores. Caseous nodules and flocks of lymph in peritoneum. Very large spleen. Hæmorrhagic petechiæ in serous covering of cæca. Mesenteric vessels engorged.

(3) BODY TEMPERATURES OF HEALTHY AND UNHEALTHY GROUSE.

	Healthy Grouse.		Grouse with Strongylosis.		Grouse with Coccidiosis.	
		Degrees F.		Degrees F.		Degrees F.
August 28, 1909	Ad. o	106·3	...		Imm. o	105·6
	Ad. o	104·3	...		Imm. o	105·6
September 4, „	Ad. o	105·1	Ad.o (*B*)	104.1	Imm. (*e*)	105·3
	Ad. o (*c*)	106·2	Imm. o (*h*)	15·8	Imm. (*g*)	105·8
„ 18, „	Ad. o (*c*)	106·2	Ad. o (*B*)	106·4	Imm. (*g*)	105·4
	Imm. o (*i*)	105·2	Imm. o (*h*)	104·7	Imm. o	105·9
	Imm. o (*j*)	106·0	...		Imm. o	107·7
October 15, „	...		Ad. o	104·3	Imm. o	104·4
	...		...		Imm. o	107·1
„ 23, „	Ad. o (*c*)	107·7	Ad. o	105·0	Imm. o	104·5
	Ad. o	107·6	...		...	
	Ad. o	105·8	...		..	
	Imm.	106·6	...		...	
	Imm.	108·2	...		...	
„ 27, „	Imm. o	106·4	Ad. o (*c*)	105·2	Imm. o	105·6
	Imm. o (*h*)	106·4	...		...	
	Imm. o (*i*)	106·8	...		...	
	Imm. o (*j*)	107·4	...		...	
November 13, „	Ad. o	107·3				
	Ad. o	106·3				
	Imm. o (*h*)	106·3				
	Imm. o (*i*)	106·6				
	Imm. o (*j*)	106·3				
Averages	106·42° F. For Grouse in full health		105·07° F. For cases of Strongylosis		105·7° F. For cases of Coccidiosis	

The inference to be drawn from the above figures is that in both Strongylosis and in Coccidiosis, the wasting and exhaustion is accompanied by a subnormal temperature at times. There is probably also at times a certain amount of fever.

The average for health is probably too low, for the amount of food in the crop must always have given a lower temperature than that of the blood.

(4) TABLE SHOWING THE CHANGE IN WEIGHT OF GROUSE ARTIFICIALLY INFECTED WITH STRONGYLOSIS AND COCCIDIOSIS.

	(*A*)	(*B*)	(*C*)	(*E*)	(*G*)	(*H*)	(*I*)	(*J*)
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
June 12, 1909								
„ 19 „								
„ 22 „	17							
„ 26 „	15							
„ 28 „	...							
July 3 „	15							
„ 8 „	12							
„ 17 „	...							
„ 23 „		17	18					
„ 28 „		...	...					
Aug. 6 „		15¾	19	5¼				
„ 10 „		15	19	6	8	18		
„ 20 „		15	19¼	7½	10	18¾		
„ 28 „		15	19	9	12	18⅓		
Sept. 4 „		14¾	19¾	9	14¾	19¾		
„ 5 „		...	...		...	...		
„ 11 „		13⅓	19	...	...	20½		
„ 19 „		13½	19		16	21½	23	21½
„ 27 „		...	...		...	...	...	...
Oct. 5 „		11¾	...		...	...	...	...
„ 18 „			20			...	...	...
„ 23 „			...			...	...	...
„ 27 „			20			20	22¼	19¾
Nov. 13 „			19¾			...	...	...
May 17, 1910			18½					

A. *Strongylosis case*, died seventeen days after first infection, having lost 5 ounces of weight.
B. *Strongylosis case*, died eighty-three days after first infection, having lost 5¼ ounces of weight.
C. *Strongylosis*. Still living on May 17th, 1910, but with a significant loss of weight.
E. Chick, *died of Coccidiosis* fifty-eight days after first infection with coccidia. Loss of weight not apparent as the bird was a young, growing chick.
G. *Coccidiosis case* in a chick, which was apparently resistant to some exteut to infection. Growing bird.
H. *Strongylosis case*, in a young growing bird still living May 1910. Not badly infected.
I. *Strongylosis case*, in a young growing Grouse still living May 1910. Not badly infected.
J. *Strongylosis case*, in a young growing Grouse still living in April 1910. *See* note on p. 112.

NOTE.

The inference to be drawn from these figures is that a marked sign of Strongylosis is loss of weight, and even in the case of Grouse (*C*), which appears to be very resistant to infection (though treated almost exactly in the same way as Grouse (*B*), the bird that died with very typical Strongylosis), there was in May 1910 a very significant loss of weight at the season of the year when it invariably shows itself in the wild bird on the moor. (*C*), having been kept on fouled ground all the winter, was as likely as any wild bird to pick up an excessive number of larval *Trichostrongylus*, as spring temperatures roused the worms to activity.

In the case of (*H*), (*I*), and (*J*), three birds purposely infected at various times during August, September, and October in 1909, and kept on fouled ground, all three remained healthy until the spring, though gradually losing weight. One of them succumbed on April 12th, 1910, and was examined by Dr Hammond Smith, who found "plenty of *Trichostrongylus*" and the "liver studded all over with white spots, which were hard and gritty." This bird was probably (*J*), but, unfortunately, the identification was lost. (*H*) and (*I*) were alive and well on May 17th, 1910, and weighed respectively 22 ounces and 21 ounces, the latter having quite a heavy infection of *Trichostrongylus*, to judge by the number of ova in the cæcal excreta. The former very few.

APPENDIX G.

ANALYSIS OF WEATHER CONDITIONS, ETC., DURING THE PERIOD OF THE INQUIRY.

By A. S. Leslie and W. Berry.

DURING each of the years 1906, 1907, 1908 the Committee have obtained exhaustive Reports on the conditions affecting the numbers and health of the Grouse stocks in different districts of England, Scotland, and Wales.

The main points dealt with in these Reports were:—

(1) Health and numbers of stocks at beginning of year.
(2) Weather in breeding season.
(3) Success or failure of breeding season.
(4) Food supply throughout the year.
(5) Results of season as evidenced by bags.
(6) Health and numbers of stocks at end of year.

It was hoped that, by making a careful collation of facts extending over a considerable period, it might be possible to learn, with some approach to accuracy, which of the various natural conditions had the most marked effect upon the health and reproductive powers of the Grouse; especially it was hoped that some light might be thrown upon such problems as the following:—

(1) What are the conditions of weather and food supply during the winter which tend to ensure a healthy and vigorous stock at the commencement of the breeding season?
(2) Are the reproductive powers of the stock most noticeably affected by the health of the birds themselves, or by the character of the weather which they experience in the breeding season? In other words will a healthy stock breed successfully in spite of adverse weather conditions, or would a better result be obtained from a less robust stock provided the weather in the pairing, sitting, and hatching seasons is ideal?
(3) What are the ideal weather conditions required to ensure a successful breeding season?
(4) What are the ideal weather conditions required to ensure a good food supply?
(5) What are the ideal weather conditions required to ensure that the chicks when hatched will live to maturity?
(6) What are the weather conditions usually associated with mortality from Strongylosis?
(7) What are the weather conditions usually associated with mortality from Coccidiosis?
(8) What connection, if any, can be established between the food supply of one year and the health of the stock in the following year?

The Reports obtained on these and other matters are full of detail, and reflect the greatest credit on the powers of observation of the correspondents who drew them up, but the work of abstracting and analysing the material has proved long and laborious, and it is to be feared that in some respects the results may not appear conclusive. Perhaps more definite results might have been obtained had the Reports been spread over a longer period, but it is reasonable to suppose that as a matter of fact the direct effect of any one natural agency is incapable of exact definition owing to the impossibility of eliminating the various other natural agencies which form factors in the case. Thus it might conceivably happen that a fine dry breeding season, which is favourable to the hatching and growth of the young chicks, might also be favourable to the development of one or other of the parasites which cause their destruction. The frost, snow, and rain which brings privation to the nesting hen and hardship to the growing brood may also serve to purify the ground of many a harmful taint. Recorded effects of different natural conditions are often unexpected, and still more often quite inconclusive as a guide to the conditions which make for the welfare of the Grouse. In such cases we must be satisfied with negative evidence, and in face of some of the beliefs which have been universally accepted in the past, even negative evidence and inconclusive results are not without their value. Hitherto, it has quite naturally been assumed that bad weather in the breeding season is universally destructive to the young stock, and must necessarily mean a bad shooting season, yet from the detailed reports now received it is surprising to find the extent to which this hardy bird may rise superior to mere climatic discomfort. Conversely an apparently perfect breeding season is sometimes followed by an unexpected shortage of young birds in August. The reason for these unexpected results must remain a subject for speculation in each case, for in each case the combination of natural conditions will be different, but at least the study will be useful if it checks the tendency to indulge in generalisations founded upon reason rather than observation.

It became evident at an early stage of the Inquiry that no Reports could be of value for the purpose of striking an average for the year unless they dealt with a similar set of conditions; it was therefore decided to divide the whole Grouse-producing area into a series of districts, each having common characteristics in respect of latitude, rainfall, altitude, etc., and then, by tracing the history of the Grouse stock in each district from one year to another, to endeavour to find a solution to some of the problems which are enumerated at the beginning of this chapter.

The Districts adopted for the purpose were those used by the British Meteorological Committee, and embraced the following geographical areas:—

Meteorological District 0. Scotland, North—Caithness, Sutherland, Ross, Cromarty, Inverness.

Meteorological District 1. Scotland, East (Northern Half)—Moray, Banff, Aberdeen, Kincardine, Forfar, Perth and Fife.

Meteorological District 1. Scotland, East (Southern Half)—The Lothians, Berwick, Peebles, Selkirk and Roxburgh.

Meteorological District 6. Scotland, West—Argyll, Bute and Arran, Stirling, Dumbarton, Renfrew, Lanark, Ayr, Wigtown, Kirkcudbright and Dumfries.

Meteorological District 2A. England, North-East — Northumberland, Durham and Yorkshire (North Riding).

Meteorological Districts 7A and 7B. England, North-West, and North Wales—Cumberland, Westmoreland, Lancashire, Cheshire, Denbigh, Montgomery.

Meteorological District 4. England, Midland Counties—Yorkshire (West Riding), Derbyshire.

Even by making use of the foregoing subdivisions it was found that many districts contained a very varied assortment of climates, altitudes, etc. Nevertheless the main climatic tendencies in each district were approximately uniform, and enabled certain broad generalisations to be made.

Before examining the records of the separate districts it may be pointed out that this department of the Inquiry commenced under favourable auspices in respect that the year 1905 had been singularly free from "Grouse Disease." In spite of the Committee's endeavours to hear of an outbreak, mortality was only reported from one district in Scotland, and then only in a mild form.[1] In fact 1905 may be regarded as one of the most disease-free years within the memory of the present generation. The stock throughout Scotland, therefore, must have commenced the period under review in a condition of perfect health, and any mortality that occurred in 1906 and the subsequent two years must have been duo to the conditions which prevailed during that period, and could not have been the result of sickness lingering from the previous year.

Let us now consider what these conditions were. Commencing with the North of Scotland we find:—

DISTRICT 0. SCOTLAND, NORTH.

1906—22 Reports.

Weather.—In the early months average winter weather inclining to wet and snow; a fair spring and early summer with a sharp snowstorm in the middle of May; a dry shooting season; an open winter with a heavy snowstorm at Christmas.

Heather.—The young heather grew well, there was little damage by frost, the bloom was good but rather late, except in Easter Ross where the reports were not so favourable.

Stock.—At the beginning of the year the stock was above the average in numbers and healthy; the breeding season was unequal; in the north and south reports were good, but in East Ross and Mid Ross there was destruction of eggs and young by frost, snow, and floods. A few isolated cases of mortality were reported (eleven birds from four Report centres, of which seven birds came from Easter Ross),[2] but nothing amounting to an outbreak. On August 12th the stock was universally above the average and very healthy; the bags were excellent, especially in the north, and the stock at the end of the year was well above the average in numbers and quite healthy.

Remarks.—A first-class season all round, large stocks, large bags, no disease. The snowfall in May apparently did no harm, though birds were sitting at the time. The unfavourable reports from Easter Ross appear to have been exaggerated; but the poor heather growth in this district may be found to have affected the health of the stock in 1907.

---

[1] *See* map 1906, Appendix I.

[2] *Ibid.*

1907—26 Reports.

Weather.—An uneventful season. In the early spring the weather was open except in the Highlands of Inverness-shire, where there was a good deal of snow in the late spring (breeding season), normal in the north, wetter in the south; August wet, September fine; mild open winter.

Heather.—In the north reports of heather growth were good, but damage by spring frosts was reported. In some places autumn burning gave better results than spring burning. Further south the heather growth was not so good; in Badenoch the heather was blighted where the drifts lay long; the bloom was late and poor, and the heather seed did not ripen very well.

Stock.—At the beginning of the year the stock was above the average in numbers and healthy; but the breeding season was extremely bad, both nesting and hatching, owing to cold and wet. There was much destruction of chicks by floods, a good many second broods and many late broods; from Ross-shire two nests were reported as having hatched after August 12th. There was little mortality from disease (sixteen birds sent for examination from seven Report centres).[1] The stock on August 12th was a good average and very healthy; the bags were above the average, in some places abnormally good, especially in Strathnairn and Badenoch. The stock at the end of the season was a good average and healthy. In Badenoch an overstock was left.

Remarks.—A bad breeding season followed by a bumper shooting season, this year furnishes an example of how a healthy stock may survive unfavourable weather conditions, probably, however, the big stock left from 1906 helped to equalise the losses in the breeding season. The mortality from disease was not appreciably greater in Easter Ross than in other districts in spite of bad heather growth reported in 1906. The poor heather growth in this year will probably be found to affect the health of the stock in 1908, especially when combined with an overstock in Badenoch and Strathnairn.

1908—24 Reports.

Weather. — In the first three months of the year average winter weather in the north, more snow in the south; April and May were cold, June and July fine. The shooting season was very fine, dry, and warm. The winter was fine and open with a severe snowstorm in the north at Christmas.

Heather. — Unanimous reports of exceptionally good heather season; growth good owing to fine summer, little damage by frost, bloom exceptionally luxuriant and early, seed ripened extremely well and early all over.

---

[1] *Vide* map, 1907, Appendix I.

Stock.—At the beginning of the year the stock was rather over the average and apparently healthy; but as the spring advanced mortality was reported from forty-eight centres, and of the birds examined a large proportion came from Badenoch and Strathnairn though Caithness, Sutherland and, to a less extent, Ross were also severely affected.[1] The breeding season was exceptionally good in Caithness; further south and west it was not good, there was a shortage of young birds which some reporters attributed to the effects of frost on the eggs, but this explanation is not quite satisfactory;[2] in Inverness it was better. On August 12th there was a fair average as regards numbers, but there still remained some signs of disease. The bags were up to the average with one notable bag of five thousand and ten brace on a high-lying moor in Inverness-shire.[3] The stock at the end of the year was about an average in numbers and quite healthy.

Remarks.—An interesting season—a fairly good breeding season was interrupted by a sharp attack of disease; this was probably due to the poor heather year of 1907 which kept the birds short of food during the winter of 1907-1908. The outbreak was most severe where the largest stocks had been left. The mortality might have assumed much larger proportions but for the timely advent of fine weather and a luxuriant growth of heather, consequently the stock was not seriously affected, and had quite regained its health by the end of the year.

The series of Reports comes to an end with the year 1908, but we may be permitted to glance at the map for 1909[4] to see whether the fine heather growth of 1908 has had the beneficial effect upon the following season that might have been expected. The result comes up to our expectations, for we find that, throughout the whole district which in 1908 had been filled with piners and sickly birds, there has not been a single case of disease except in those districts lying between Badenoch and Loch Ness where we anticipated some mortality on account of the large overstock left from 1908.

DISTRICT 1. SCOTLAND EAST (NORTHERN HALF).

1906—25 Reports.

Weather.—For the early parts of the year the Reports vary. Near the coast the weather was rather open, inland it was much colder with snow in Perthshire. In May there was a very severe snowstorm in the north-east, particularly in the high ground of Aberdeenshire. In Perthshire May was wet, cold, and frosty. The weather in the shooting season was good, though in some places August was wet. After that the weather was normal till Christmas, when there was a severe snowstorm.

---

[1] *Vide* map, 1908, Appendix I.

[2] *Vide* Appendix H. p. 133.

[3] This bag is of special interest owing to the fact that this moor was under snow during the whole winter, and had not a single bird on it till the mouth of May, when a breeding stock appeared simultaneously with the disappearance of the snow. This stock was particularly healthy and prolific, probably owing to the heather having remained uncontaminated for so long; a much larger bag might have been killed. *Vide* Table (Moor No 7) vol. i. p. 456.

[4] *Vide* map, 1909, Appendix I.

Heather.—Young heather grew fairly well; but in this district it grows very slowly after burning. Several reporters express favourable views on the effect of autumn burning; the bloom was late but good, and the seed ripened well throughout the district.

Stock.—At the beginning of the season the stock was above the average and healthy. The breeding season was reported to be very bad with good nesting but bad hatching weather; much damage reported from snow and frost in May. Owners were in despair at the bad breeding season, and in some cases, especially in Aberdeenshire, even cancelled their arrangements for shooting their ground. Yet on the 12th the stock was universally good and very healthy, and the bags throughout the district were far above the average. Only one case of disease was reported,[1] and at the end of the season the stock was above the average and very healthy.

Remarks.—A first-rate season all round, large stocks, large bags, no sickness, in spite of conditions which were at the time believed to be disastrous. The prospects for 1907 are fairly good; but there is a danger owing to the large stock left.

1907—54 Reports.

Weather.—In the early part of the year the weather was normal, with stormy weather on the hills, snow on the east coast and in Perthshire, and some frost. The breeding season was generally wet and cold, August was wet, September fine; the winter was variable and rather open.

Heather.—Over the whole district the heather growth was poor, both young and old; many reports received of damage by frost, bloom universally late and poor. Seed ripened very badly, and there was little of it; a very bad heather year.

Stock.—At the beginning of the year the stock was above the average and healthy; but some weak spots developed later, especially in Perthshire. Over eighty birds were received from thirty-five centres, eight from Moray and Banff, fifteen from the Borders of Aberdeen and Kincardine, five from Forfarshire, and forty-two from Perthshire.[2] The breeding season was universally bad owing to wet and cold, especially in Kincardine and Perthshire, where many young were destroyed; not many second broods except in Perthshire. On the 12th the stock in Moray and Banff was far above the average in numbers, Aberdeen above the average, Kincardine and Forfar not so good, Perth poor, being very patchy with few young birds. The shooting season showed corresponding results, very large bags in Moray and Banff, good bags in Aberdeen and Kincardine, not so good in Perth. The stock at the end of the year was healthy throughout, and the numbers left were above the average in the north and normal in the south.

Remarks.—A very bad breeding season and a very bad heather year; the former might have been expected to affect the stock of young birds equally throughout the district. In actual fact this did not occur, for the birds in the north were not affected by the bad breeding season, whereas in certain districts in the south the shortage of young birds was very serious. The reason for the shortage was obviously bad health rather than bad weather, for in those parts of Perthshire where the stock was healthy, the bags were good in spite of the bad breeding season. There does not appear to be any reason why the stocks should have been more healthy in the north than in the south. The prospects for 1908 are not good; 1907 having been a bad heather year, the danger will be greatest in the north owing to the large stocks left.

---

[1] *Vide* map, 1906, Appendix I.

[2] *Vide* map, 1907, Appendix I.

1908—47 Reports.

Weather.—A fine open January and February, March cold and stormy with wet and frost in places, April very wintry with hard frosts at the end of the month and in the beginning of May (17°, 16°, and 18° Fahren.), May, June, and July universally fine, dry and warm, August dry, September wet, followed by fine weather with a snowstorm in December.

Heather.—The growth was excellent; on one moor in Perthshire birds were reported to be feeding on ground burned this spring. The growth was checked temporarily by the frosts in April and May; but the bloom was exceptionally good and early, and the seed ripened well all over the district; a first-rate heather year.

Stock.—At the beginning of the year the stock was above the average in numbers but in one or two places it was reported not very healthy. The breeding season was disappointing considering the favourable hatching weather, the nests were very badly filled, and a mysterious disappearance of chicks was reported from many districts. A good deal of disease was reported, especially from Moray, Banff, and Aberdeen,[1] where the large stock had been left from 1907. On the other hand, from one district which had been swept by disease in 1907 the reports were excellent—well-filled nests, plenty of young birds, no disease.[2] On August 12th the stocks were reported unequal, but the majority were below the average in numbers, and in many cases birds were reported still sickly; afterwards the stock recovered, and at the end of the year was reported to be a fair average in numbers and very healthy.

Remarks.—This season offers an opportunity for considerable speculation; very cold weather in the mating season, frost in the nesting season, magnificent weather in the hatching season, and a fine warm summer. Why were the results so bad? Many reporters consider that the shortage was due to loss of eggs by frost; but there is little evidence in support of this view, for what eggs there were seemed to have hatched out unusually well; and it must be borne in mind that the shortage was noted before the frost came for there were few eggs in the nests. Possibly the wintry weather in the mating season may have caused the birds to postpone their pairing, and so delayed and disorganised their usual breeding habits; colour is lent to this view by the fact that many barren birds were seen, the inference being that these birds might have mated and bred had the weather conditions been more favourable. Against this theory we have the experience of 1906 and 1907, where it was conclusively shown that a healthy stock of birds can breed prolifically even under the most unfavourable weather conditions. And so we are forced to adopt the view that the solution of the problem must have something to do with the condition of the parent stock rather than with the weather. We know that the stock has wintered badly, we know that many birds are pining and sickly, and we also know from anatomical investigation that a bird when attacked by Strongylosis often becomes incapable of breeding owing to the non-development of the reproductive organs.[1] One point of exceptional interest is the mysterious disappearance of chicks in a season which appeared to be ideal for the growth and development of young birds. This phenomenon seems to have puzzled many of the reporters. Some ascribe the loss of chicks to drought, others blame migration, but for the reasons given in another part of this book neither of these solutions appears to be the correct one.[2] The view already expressed that the mortality may be due to Coccidiosis[3] is suggested as a more probable explanation, and is supported by the fact that warm, dry weather appears to be favourable to the development of this parasite.[4] Until more evidence is obtained on the subject, however, the question cannot be regarded as settled.

---

[1] *Vide* map, 1908, Appendix I.

[2] *Vide* Note in Appendix H. p. 134.

If we again refer to the map for 1909, we find that the fine heather year in 1908 has had the effect of entirely restoring the health of the birds. Only two isolated cases of mortality were reported throughout the whole of this extensive district.[5]

DISTRICT 1. SCOTLAND EAST (SOUTHERN HALF).

1906—6 Reports.

Weather.—A normal year, except for much snow in May; a very wet August and October, and more snow in December.

Heather.—Young heather grew well, especially after autumn-burning; some damage by frost in the Lammermoors and Peebles. The bloom was variable, but the seed ripened well.

Stock.—The year began with a healthy stock, above the average in numbers. The breeding season was bad, many eggs and young birds being destroyed by snow, frost, and rain. Mortality was reported in the spring from several districts, more especially Peebles and Selkirk.[6] The stock on August 12th was below the average, but quite healthy. The bags were below the average, and the stock left was about an average and quite healthy.

Remarks.—Here for the first time we find the stock seriously affected by the bad weather in the breeding season, for the "disease" does not seem to have been sufficiently severe to account for the great shortage of young birds, though it may have contributed. The nesting season is described as the worst for years, nearly all the early broods were destroyed in some places, and everywhere there were many second broods. These second broods and late hatchings will probably affect the health of the stock in 1907, for late birds have not the same stamina as early ones, and the heather crop is only moderate.

---

[1] *Vide* vol. i. chap. v. p. 127.
[2] *Vide* vol. i. chap. ii. pp. 15, 16.
[3] *Ibid.* p. 16.
[4] *Vide* vol. i. chap. xi. p. 264.
[5] *Vide* map, 1909, Appendix I.
[6] *Vide* map, 1906, Appendix I.

1907—10 Reports.

Weather.—Variable in the early months. The breeding season was rather cold and wet. A wet August was followed by a dry September, and the winter was open.

Heather.—The spring growth was poor, but grew best after autumn-burning; the bloom was late and poor, and the seed ripened badly—a bad heather year.

Stock.—A good healthy stock at the beginning of the year. The breeding season was unfavourable owing to cold and wet; but the losses do not appear to have been serious. There was a good deal of sickness throughout the district[1] with a remarkable three weeks' outbreak on the Lammermoors in April, which swept off 10 per cent. of the birds, nearly all cocks. The attack passed away as suddenly as it had come, and the stock on August 12th was much over the average in numbers and very healthy. Elsewhere the stocks on the 12th were irregular, and the bags variable; the stock left was about an average in numbers and quite healthy.

Remarks.—As was to be expected there were a good many scattered cases of mortality, though the outbreaks were nowhere very severe except on the Lammermoors, where an excellent example was furnished of a quick recovery before any harm had been done. The cause of the recovery was probably a sudden burst of young growth on the heather which enabled the birds to obtain food on uncontaminated ground. As is usually the case when an outbreak occurs in April, it was chiefly cocks that died;[2] had the attack extended into May and June hens also would have been affected, and the effect on the young stock would have been serious. The prospects for 1908 are not difficult to forecast. The bad heather year in 1907 will make the wintering poor, and there is sure to be some mortality in the spring; but it will probably not be very serious for the birds of this year were hatched early and are consequently vigorous, they are in excellent condition and no overstocks are reported.

1908—10 Reports.

Weather.—A normal winter with a cold, wet March, followed by a very severe frost in April and snow in places May and June; rather cold July; August and September fine, hot, and dry. A fine open winter.

Heather.—As in other districts this was an exceptionally good heather year. Some damage was caused by the frost in April; but the bloom was excellent, and the seed ripened well.

---

[1] *Vide* map, 1907, Appendix I.

[2] *Vide* vol. i. chap. vi. p. 136.

Stock.—At the beginning of the season there was an average stock, all healthy except on one moor in Midlothian. The nesting season was favourable except for losses from frost in April, and on the Pentlands from snow which covered the nests for ten days.[1] Everywhere there were a number of unhatched eggs left in the nests, and broods were small. A certain number of isolated cases of "disease" were reported, but it was nowhere serious except on the Midlothian moor referred to where early mortality was reported.[2] On August 12th there was a fair stock of healthy birds, the bags were a little below the average, and an average healthy stock was left.

Remarks.—The only unusual event was on the Midlothian moor where mortality was reported at a much earlier date than is usually the case. The fact that many eggs were left unhatched in the nests may have been due to damage by frost, or because their fertility was impaired owing to the parent birds being in indifferent health and condition after bad wintering.[3]

The good heather year in 1908 resulted as before in an improvement in the health of the stock in 1909, though this improvement was not so marked as in some of the other districts.[4]

DISTRICT 6. SCOTLAND, WEST.

1906—32 Reports.

Weather.—The reports vary considerably in different parts of the country; the early part of the year appears to have been rather wet; the breeding season was good in Argyllshire, but, further south, May was wet. August was hot, September fine. The end of the year was wet and stormy, with snow at Christmas.

Heather.—The reports were contradictory; on the whole a normal year for growth, bloom, and seed. The reports as to the effect of frost vary greatly.

Stock.—The year began with a good average stock of healthy birds. The breeding season in Argyllshire was good, with some flooding in May. Elsewhere it was a bad breeding season, eggs were frosted, birds drowned, and there were a good many second broods. A few cases of mortality were reported, but there were no serious outbreaks.[5] The stock on August 12th was a good average, counting second broods, and quite healthy; in some places the stocks were exceptionally good. The bags ranged from a good average to exceptionally good, and the stocks left were above the average and healthy.

Remarks.—It is difficult to deduce information from the reports owing to the variety of conditions in the district. The mild climate of West Argyllshire is so distinct from that of

---

[1] *Vide* vol. i. chap. ii. p. 10.

[2] *Vide* map, 1908, Appendix I.

[3] *Vide* Appendix II. p. 133.

[4] *Vide* map, 1909, Appendix I.

[5] *Vide* map, 1906, Appendix I.

Lanark and Dumfries that wet weather in the first-named county may be represented by hard frost in the last two. The season as a whole was good all over, and justifies the view that a good healthy stock will breed a good healthy stock in spite of bad weather in the breeding season.

1907—40 Reports.

Weather.—The season as a whole was cold, wet, and cheerless, with frost and snow in the early part of the year. April normal, May and June very wet and cold, July fine. The shooting season was wet, and the end of the year wet and cold.

Heather.—A poor heather year; growth was moderate, but the bloom was late and poor, and the seed ripened badly.

Stock.—At the beginning of the year the stock was rather above the average and healthy. The nesting season was bad, and the hatching season very bad. Many losses of nests and much drowning of chicks was reported, and in some districts there were many second broods.

Mortality from "disease" was reported in April and May from many places throughout the district,[1] but though general it nowhere assumed the importance of a serious outbreak, and by August 12th the birds had practically recovered their health. The stocks on the 12th were mostly below the average, and bags were poor with one or two striking exceptions, especially in Lanarkshire where stocks were good. The stocks at the end of the season rather below the average and quite healthy.

Remarks.—A cold, wet season, a bad heather year, much mortality in nesting season resulting in small bags, some losses from disease. Here, again, we find losses in the nesting season owing to exceptionally bad weather; but the results were not so bad as might have been expected, and in some cases the bags were good in spite of adverse circumstances. As a rule it was found that the nesting results were worst on those moors where birds were unhealthy. The reason for the birds being unhealthy cannot be stated with certainty, but was probably connected with delay of the young growth owing to the backward spring. It is to be expected that the bad heather year will have a bad effect on the stock in 1908, but the fact that the stocks are moderate may go far to save them from serious disaster.

1908—26 Reports.

Weather.—The first three months were good, with some wet weather in Kintyre; the nesting season was dry and favourable, but a severe frost was reported universally in the third week of April, ranging from 10° to 22° F. according to the district; a fine summer except September, which was wet; snow at the end of the year.

Heather.—A good year for growth, but much frosting of heather was reported from Argyllshire; the bloom was universally excellent, and the seed ripened well throughout.

Stock.—At the beginning of the year the stock was moderate in numbers and healthy. The nesting and hatching seasons were unequal, good in Argyllshire, not so good in Ayr and

---

[1] *Vide* map, 1907, Appendix I.

Lanark, where it was reported that eggs were destroyed by frost; in some places many young birds disappeared mysteriously in the dry weather, and most of the reporters ascribe this to drought. A good deal of mortality from disease was reported from North Ayrshire, especially on those moors where a large stock had been left.[1] On August 12th the birds were almost universally healthy, but below the average in numbers, and the bags were small. The stocks left at the end of the year were rather below the average and quite healthy.

Remarks.—The general health of the stock was only moderate, but was better than might have been expected considering the poor heather year in 1907. This was probably due to small stocks being left. The reports of heather being frosted in Argyll were probably incorrect, for there was less frost in that county than in any other, and it passed away long before the young growth of heather had made an appearance. The cause of damage was far more likely to have been the heather beetle (*Lochmæa suturalis*),[2] which did a good deal of harm in this year. With regard to the disappearance of young birds in the dry weather see the remarks on this subject on p. 120.

The good heather year in 1908, combined with the light stocks left at the end of the year, resulted as before in a marked improvement in the health of the birds in 1909; only one isolated case of "disease" being reported for that year.[3]

DISTRICT 2A. ENGLAND, NORTH-EAST.

1906—11 Reports.

Weather.—A normal year with an unfavourable nesting and hatching season, and a snowstorm in December.

Heather.—No outstanding facts were reported. Autumn-burnt ground made the quickest growth, and heather grew best where the ground was wet at the time of burning. The bloom and seed were not very good.

Stock.—The year commenced with a good average of healthy birds. The breeding and hatching seasons were disastrous, eggs were destroyed by snow, frost, and floods, and young birds by cold and floods. There were many second broods, yet in some cases eggs bleached quite white with rain hatched out. Only five diseased birds representing two moors were sent to the Committee for examination. The stock in the shooting season was rather below the average, as also were the bags; but at the end of the year the stock was up to the average and healthy.

Remarks.—An abnormally bad nesting and hatching season, yet the stock was surprisingly good, doubtless owing to the excellent health of the birds.

---

[1] *Vide* map, 1908, Appendix I.
[2] *Vide* vol. i. chap. xix. pp. 414 *et seq.*
[3] *Vide* map, 1909, Appendix I.

1907—15 Reports.

Weather.—At first normal with a fine March, cold and wet in April and May, better in June and July, August wet, September fine, thereafter inclined to wet.

Heather.—The growth was universally bad, much damage being caused by frost, especially to old heather. The bloom was late and poor, and the seed ripened very badly.

Stock.—The reports vary, but on the whole the stocks at the beginning seem to have been rather over the average, and healthy except in the North Tyne district. The nesting season was bad, and the hatching season very bad, owing to frost, hail, wet, and cold; there were a good many second broods. "Disease" was reported from nine districts, and twenty-two specimens were sent up for examination; but the outbreak was only severe in the North Tyne area, and the district as a whole was healthy. The stock on August 12th was exactly an average and quite healthy. Except in the North Tyne district, the bags were up to the average, and at the end of the year the stock was a good average and universally healthy.

Remarks.—Rather a cold, wet season and a very bad heather year; the breeding season was unusually bad, yet once more the young birds did well, except where the parent birds were unhealthy. 1908 will probably be a bad year.

1908—12 Reports.

Weather.—Average winter weather for the first three months with snow and frost in April, a normal summer and a fine mild winter.

Heather.—A very good year for growth; damage by frost reported in one case only. The bloom was good and early except in Wensleydale, and the seed ripened well except on the high ground.

Stock.—At the beginning of the year the stock was rather above the average and healthy; except in the North Tyne district where "disease" reappeared early in the year. The breeding season was unfavourable, snow and frost destroyed many eggs but not many chicks; there were many second (or late) broods. On the whole the birds were fairly healthy, though on some moors they were reported to be in poor condition, and a few were found dead. The reports of the stock on August 12th were very variable, as also were the bags, and neither of these can be summarised. At the end of the year there was a good average stock, and the birds were quite healthy.

Remarks.—The year was unexpectedly healthy considering the unfavourable wintering conditions.

As might be expected after the good heather year in 1908, the stock in 1909 was exceptionally healthy.

DISTRICT 7A AND 7B. ENGLAND, NORTH-WEST AND NORTH.

1906—6 Reports.

Weather.—No special features, some snow and rain in May, otherwise a fair average season.

Heather.—Growth of young heather was fair, spring-burnt being the best; the bloom was poor and late, and the seed ripened badly.

Stock.—At the beginning of the year there was a good healthy stock. The breeding season was very unfavourable, both eggs and young being destroyed, yet only in a few places was the stock on August 12th below the average on the bags affected; there was no "disease." At the end of the season the stock was up to a fair average and healthy.

Remarks.—An uneventful year. The bad growth of heather may have a detrimental effect upon the health of the stock in 1907.

1907—11 Reports.

Weather.—Normal at first, then wet and cold, especially in May and June; but July was warm and dry, August wet, September fine, and the autumn wet.

Heather.—On the whole the growth was bad—best after autumn-burning. The bloom was universally late and poor, and the seed ripened badly except in Wales.

Stock.—At the beginning of the year the stocks were a good average and healthy, except on one moor in Cumberland. The breeding season was universally bad. Eggs were destroyed by frost and floods, young birds lost in large numbers by drowning. A good deal of disease was reported. The stock on August 12th was below the average, so were the bags. At the end of the year a fair average stock was left.

Remarks.—Nothing calls for special attention. The bad heather year in 1906 does not seem to have affected the stock seriously; but the birds were not in really good condition.

1908—11 Reports.

Weather.—A wet and snowy winter was followed by frost and snow in April (6°, 7°, and 17°), then finer; but heavy rain in June. A fine August and wet September were followed by a fine, mild, open winter with some snow in December.

Heather.—A good year for growth; the bloom was good and early, and the seed ripened well.

Stock.—At the commencement of the year there was a fair average stock and quite healthy, except on one moor in Lancashire, where the stock was small and the birds were dying in large numbers. In the breeding season there was an outbreak of mortality in one or two places; it was chiefly cocks that died, and when this occurred the eggs were unfertile. Frost and snow destroyed many nests, and there were many second broods. The reports on August 12th were conflicting. At the end of the year there was a fair stock and quite healthy.

Remarks.—Two bad heather years have had their effect upon the health of the birds, but there has been no general outbreak of "disease."

District 4. England, Midland Counties.

1906—10 Reports.

Weather.—A mild season till May, when the weather turned wet and cold with snow in parts. August was wet, September fine, and the end of the year was very wet with snow in December.

Heather.—Young heather grew well, especially when burnt in spring. There was some damage by frost in May; the bloom was fairly good but late, and the seed ripened fairly well.

Stock.—At the beginning of the season the stock was above the average and healthy. The breeding season was most unfavourable, eggs were destroyed by frost, and chicks by floods and cold. There were many second broods, but these did well owing to first broods being early. The stock on August 12th was fair on the low ground and bad on the high ground, the bags were rather below the average, and at the end of the year there was a fair average of healthy birds. There was no "disease."

1907—9 Reports.

Weather.—The early part of the year was normal, but rather wet and cold. The breeding season was very wet and cold, especially in the hatching season. August was wet, September fine, and the end of the year was wet and cold.

Heather.—A bad heather year; young growth poor and much damaged by frost. Bloom universally bad and late; seed ripened badly except in a few places where it ripened fairly well in spite of late bloom.

Stock.—At the commencement of the year there was a fair average of healthy birds. The nesting and hatching seasons were fairly good, though some eggs were lost; but there was a great mortality among the young birds owing to extreme wet and cold in May and June. There were not many second broods. A few cases of "disease" were reported. The stocks in the shooting season were all below the average, and the bags were poor. A fair average stock was left, and very healthy.

1908—7 Reports.

Weather.—Wintry weather in beginning of the year. April very cold with snow and frost, thereafter fine and normal.

Heather.—Young heather grew well; the bloom was good, and the seed ripened well.

Stock.—The year began with a good average stock and healthy. The snow in April did much damage to eggs. There were a good many second broods. On August 12th the stock was up to the average and healthy, the bags were below the average, and the stocks left were below the average but healthy.

Remarks.—The health of the stock in 1909 was excellent, only one isolated case of "disease" being reported.

SUMMARY OF RESULTS OBTAINED.

From the foregoing abstract of Reports, it will be seen that the weather conditions varied considerably in different parts of the country. In the majority of cases the combinations of natural causes produced results which might have been expected—this is especially well marked in Scotland. In other cases the results came as a surprise, but were sufficiently conclusive to justify us in amending some of the theories which have hitherto been regarded as established. The Reports are capable of various constructions, but the following may be regarded as a reasonable interpretation of some of the facts observed.

1. *Good Heather Growth, i.e.*, good growth of leaf, flower, and seed, is followed by a healthy stock in the following year. We have a striking example of this in 1908-1909, when a first-rate heather crop was succeeded by a disease-free year. It follows that when the heather growth is good a large stock may be left.
2. *Bad Heather Growth* is usually followed by some mortality, and where stocks are large this mortality may assume serious proportions. It follows that when the heather growth is poor stocks should be killed down.
3. *The Direct Effect of Weather Conditions on Grouse.*—The direct effect of weather upon Grouse seems to be slight, though the indirect effect as affecting their food supply is enormous. Adult Grouse seem to be unaffected by cold, snow, wet, or frost, and even in the breeding season the destruction of eggs and young caused by climatic conditions does not seem to be disastrous except in a few extreme cases. It is true that many reporters speak to the fact of eggs being destroyed by frost, snow, and rain, and chicks being killed by wet and cold; but as the statement is often followed by a favourable report upon the young stock on August 12th it is obvious that the damage cannot have been so serious as was supposed, or that what damage there was had been repaired. We have too much faith in the accuracy of the Reports to suppose that no such losses have occurred; but we believe that where the stock is healthy the nests contain a larger proportion of eggs, and that a larger proportion of these are fertile, consequently a loss of even 25 per cent. of eggs and chicks might still leave a very satisfactory stock of young birds. Then, again, there is

always a possibility that these losses may be repaired by means of second broods, and where the parent stock is healthy there is more chance of these second broods being successful. The case is different where the stock is unhealthy, for then the nests contain fewer eggs, the eggs are less fertile and the parent birds have not sufficient stamina to produce successful second broods. This seems to be a reasonable explanation of the rather puzzling fact that it is only where the parent birds are unhealthy that the young stock seems to be seriously reduced by bad weather in the breeding season. Another possible explanation is that the weather does not affect the case at all, and that the only reason for the failure of the young stock is that the parent birds are unhealthy, and therefore not prolific. But this explanation would entail the discarding of the unanimous evidence of the reporters on the subject, and we think that the evidence goes far to establish the following points.

(*a*) Eggs may be destroyed by (1) snow; (2) frost; (3) wet; their liability to destruction depends upon the stage of development they have reached. If they have not yet been sat on probably none of these agencies will destroy them, provided the hen does not desert or lose the nest. We know of cases when eggs have been buried in snow for many days,[1] or have been covered to a depth of several inches with water without suffering any harm. On one occasion (May 14th, 1911) a sitting hen was driven off her nest by flooding; the eggs were covered with water and their colour washed off, nevertheless the hen returned, and on May 25th the whole clutch hatched out. Frost, unless very severe, is probably less destructive than rain or even snow, for while the hen is sitting the eggs are safe, and before she has begun to sit it is doubtful if they are damaged unless the frost is hard enough to split them.

(*b*) Young chicks may be destroyed by drowning, but are seldom killed by frost, snow, or extreme cold.

(*c*) Very hot, dry weather after hatching has sometimes been associated with loss of chicks; a possible solution is suggested on p. 264 vol. i.

4. *Relation of Weather Conditions to Health of Stock.*—If the stock is healthy bad weather in the breeding season does little harm; if the stock is unhealthy bad weather at nesting and hatching time will result in a failure of young birds.

The effects of a good breeding season upon a healthy and unhealthy stock respectively cannot be stated with certainty, for during the three years under review there was no really good breeding season. The nearest approach to favourable conditions occurred in the east of Scotland in 1908, and then the results seemed to indicate that even where the weather conditions are favourable an unhealthy stock will not be prolific.[2]

In the light of the foregoing remarks we may now with some confidence attempt to answer the list of queries with which this chapter opened.

(1) The weather during the winter appears to be immaterial, provided the food supply is good. The winter food supply depends on (*a*) good spring growth; (*b*) good summer bloom; (*c*) good autumn seed in the preceding year. The first-named

---

[1] *Vide* vol. i. chap. ii. p. 10.

[2] *Vide* pp. 119-120.

item is probably the most essential, and the second is probably only a result of the first, but as it is more easily noticed it forms the best guide to the prospects of the following year. A good year for corn crops is usually a good year for heather.

(2) The health of the birds is of far greater importance than the weather in the breeding season.

(3) It is believed that the best weather conditions in the breeding season are an early spring and an absence of all climatic extremes. Mere cold probably does little harm, and rain or snow in moderation may be disregarded. The important matter is that the stock should pair early and proceed with their nesting without interruption. The value of early hatchings is referred to elsewhere.[1]

(4) From the reports it would appear that fine, dry, warm weather from May to July is associated with the best growth of leaf and bloom, and early bloom is followed by well-ripened seed, unless the autumn is unusually wet. Occasionally late bloom may result in a well-ripened crop of seed if the autumn is fine and warm. It would appear from the Reports for 1908 that a hard frost in April is not injurious to growth, but probably frost in May would retard it seriously.

(5) Once the chicks are hatched they will survive all ordinary weather conditions; but excessive wet soon after hatching means great danger from drowning. A very hot, dry summer has been associated with a disappearance of the young stock, but the exact reason for this requires further investigation.[2] The rapid growth and development of chicks probably depends entirely on a good food supply, *i.e.*, a good spring growth of heather.

(6) Strongylosis is probably caused by insufficient or inferior food during the months of February to April rather than by any particular weather conditions at the date of the attack. Insufficient food causes the winter feeding areas to be restricted, and so the ground becomes contaminated with the Strongyle worm. Weather conditions may indirectly affect the case, but to what extent cannot be stated with certainty. Heavy snow would, doubtless, be beneficial by covering certain feeding areas and keeping them uncontaminated until the snow has melted; on the other hand, it would tend to further restrict the feeding areas so long as it lay on the ground. It has been thought that heavy rain might be beneficial as a means of purifying the ground, but experiments have proved that the larvæ of this worm seem to flourish best in damp surroundings.[3] Frost and dry cold may do something to suspend the vitality of the larvæ for a time, but drought is the only climatic condition which appears to do it any permanent harm.

(7) Coccidiosis as a disease in Grouse chicks has only recently come under investigation, and the study of the subject is attended with much difficulty. From experiments in the laboratory it has been found that the Coccidium develops most rapidly under conditions of warmth and drought, and it is certain that

---

[1] *Vide* vol. i. chap. xxi. pp. 470 *et seq.*

[2] *Vide antea*, p. 129, vol. i. chap. ii. p. 16. chap. xi. p. 264.

[3] *Vide* vol. i. chap. x. pp. 232-233.

in the hot, dry summer of 1908 there was a loss of Grouse chicks from some unknown cause.

(8) The foregoing Reports have established a clear connection between a good heather year and a healthy stock the following spring.

It may be thought that the foregoing observations are of little practical value to moor-owners and sportsmen, since they only go to prove that the welfare of the Grouse is in the hands of Providence, and that there is nothing that man can do to improve the spring growth of heather or moderate the rainfall of May; but apart altogether from the general necessity of knowing the natural conditions which affect the bird, it is believed that the ascertainment of the foregoing facts may be of some real practical value to game preservers.

It has already been pointed out that the condition of the heather may be a useful guide as to the manner in which the stock should be regulated in accordance with the probable food supply available for wintering; but it is also hoped that by proving the supreme importance of good winter food on the health of the bird, owners and their servants may be encouraged to give more attention to the question of heather culture. It is true that in a poor heather year the heather on a well-burned moor will suffer equally in proportion with that on a badly-burned moor, but the total area of winter feeding on the former is so much greater than on the latter, that the well-burned moor can better stand the strain of a lean harvest, and its stock will manage to struggle through the winter without serious loss; while on less well managed ground the mortality may be very heavy. Heather culture is better understood and more extensively practised in England than it is in Scotland, and to this is probably due the fact that the health of the Grouse in that country does not appear to have been so seriously affected by the bad heather crop of 1907 as it was in Scotland whenever the heather crop failed. On those moors in Scotland, where heather burning has been carried out on proper lines, it is found that the stock is not so hard hit after a bad heather year, and always makes a more rapid recovery than when the heather has been neglected.

APPENDIX H.

ANALYSIS OF REPORTS ON THE EFFECT OF FROST ON THE EGGS AND YOUNG OF GROUSE IN THE SPRING OF 1908.

By A. S. Leslie.

In the summer of 1908 the following letter was sent to about three hundred correspondents in England and Scotland:—

"The Committee is anxious to obtain information as to the effect of frost upon the eggs of Grouse. It has been said that Grouse eggs may be frozen hard to the nest without impairing their fertility. The Committee would like to have the evidence of gamekeepers on this point. It has also been stated that when eggs have been destroyed by frost the hen will not desert the nest and rear a second brood, but will go on sitting on the frosted eggs, and will sometimes succumb in consequence; that second broods only occur where eggs have been completely destroyed or lost as a consequence of accident, floods, snowstorms, etc. The present year was marked by a very severe frost at the beginning of the nesting season; but there were no other unfavourable conditions, such as floods and snowstorms. Yet it has been reported from some districts that many of the young birds are very small, apparently hatched about the end of June, and having all the appearance of second broods. It would be interesting to know whether these are in fact second broods or merely first broods hatched late owing to the cold spring causing the birds to postpone nesting operations. I shall be obliged if you will kindly let me have your views on this question."

This letter was followed by a series of questions on specific points with a view to ascertaining the amount of damage done by frost, and the following is a brief summary of the answers received.

District 0. Scotland, North—Caithness, Sutherland, Ross, Cromarty, and Inverness.

20 Reports.

Three days of very severe frost occurred on April 23rd, 24th, and 25th — the thermometer readings in several places being as low as 12°, 13°, 14°, and 15°.

A universal opinion was expressed that the frost did little or no harm—no eggs were split by the frost. But the hatching season was late, and a good many unfertile eggs were left in the nests. A large number of barren birds were seen, and the coveys were very irregular—in some cases only one or two young birds in a covey.

Remarks.—The failure of the breeding season seems to have been due to the poor condition of the stock rather than to frost. The heather in 1907 had been bad.

DISTRICT 1. SCOTLAND, EAST (NORTHERN HALF)—MORAY, BANFF, ABERDEEN, KINCARDINE, FORFAR, PERTH.

39 Reports.

As in District 0 there were three days' severe frost — the readings being as low as 4°, 8°, 9°, 10°, 12°, 14°.

Only five out of thirty-nine correspondents considered that the eggs had been damaged by frost, and these did not write from the places where the frost had been most severe. Seven cases were reported of eggs being split by the frost.

The number of eggs in each nest was about six and a half, or rather below the average; a good number of unfertile eggs were left in the nests, probably an average of about one egg in each nest. On August 12th there was an unexpected scarcity of young birds, only an average of three and a half in each covey, which implied heavy mortality amongst the chicks.

Except in a specially favoured district, when the conditions appear to have been favourable in all respects, every reporter spoke to an exceptional number of barren birds.

Remarks.—This series of Reports gives material for much speculation. In view of the exceptional frost in the nesting season the natural tendency was to blame the frost for the failure of the young stock; but the frost does not seem to have done much harm, and even if every egg left unhatched had owed its destruction to frost it would only have accounted for a loss of one bird in each covey, whereas the actual shortage averaged three in each covey.

The results would be more striking were it not that in one district from which seven reports were received the results were excellent, the clutches averaged eight eggs in each nest, the young birds on the 12th averaged six in each covey, and there were no barren birds.

It is not easy to account for all the facts observed, but the following suggestions have been offered.

(1) Apart from the specially favoured district referred to, the breeding season was a failure—small clutches, unfertile eggs, many barren birds; all this would imply that the health of the parent stock was low at the beginning of the nesting season.

(2) Another view is that the exceptionally cold, frosty weather interrupted breeding operations at a critical period, and consequently many birds bred badly, while some did not breed at all.

(3) The mortality amongst chicks was not due to the bad health of the parent stock or to the frost, but must have been caused by some infantile disease such as Coccidiosis.

(4) The special exemptions of one district from the universal failure might have been due to the fact that the frost there was a few degrees less severe than in the remainder of the district.

(5) The only other point which distinguished the exempted area from the remainder of the district was that in the spring of 1907 there had been a very severe outbreak of mortality in the exempted area, thus greatly reducing the stocks; this reduction may have been a reason for their having maintained their health in a bad heather season. The fact that the adult birds in the exempted area maintained their health and vigour right through the spring of 1908, whereas in the rest of the district there was considerable mortality, suggests a connection between the health of the parent stock and the success of the breeding season.

District 1. Scotland, East (Southern Half)—Lothians, Berwick, Peebles, Selkirk, and Roxburghshire.

9 Reports.

In this district the frost was not so severe as it was further north, the lowest readings being given as 7°, 7°, 10°, 12°, 13°, 15°, from different centres, yet the damage from frost was reported as serious, more than one-half of the reporters expressing the opinion that eggs had been destroyed by the frost on April 23rd and 24th. Five reporters spoke to eggs being split.

The breeding season was a bad one, the clutches averaged seven in a nest; but many eggs were left unhatched, and only about four young birds in each covey came to maturity. There were many barren birds.

Remarks.—The results from this district certainly point to the fact that the eggs were damaged by the frost in April, and this view is strengthened by the statement that in several places second broods, hatched from eggs laid after the frost had gone, did much better than the earlier broods, thus implying that the failure was not due to the condition of the parent stock. Why the frost should have caused more damage here than further north cannot be stated with certainty, but the following solutions have been suggested: (1) That a larger number of eggs had been laid in the nests at the date of the frost than on the later moors further north; (2) That the eggs that were laid had reached a more advanced stage, and were therefore more susceptible to extremes of temperature; and (3) That the Grouse in this more southern district were less well acclimatised to severe weather conditions than in the north and north-east of Scotland, and that, therefore, they and their eggs were more seriously affected by the severe frost than were the stocks accustomed to a more rigorous climate. There is no evidence to support any of these contentions, and the question must remain one for surmise.

An interesting case is recorded from Roxburghshire as follows: "10° of frost will do Grouse eggs no harm; 17° will split them. I have known a Grouse and Pheasant lay together, the Pheasant had four eggs, the Grouse three. There were 10° of frost, the Grouse eggs hatched, and the Pheasant eggs were all split. The Pheasant laid other three eggs after the frost, which she hatched out along with the three Grouse eggs."

DISTRICT 6. SCOTLAND, WEST—ARGYLL, BUTE AND ARRAN, STIRLING, DUMBARTON, RENFREW, AYR, LANARK, WIGTOWN, KIRKCUDBRIGHT, DUMFRIES.

33 Reports.

The frost in this district was far less severe than towards the north and east. With one doubtful exception there were no readings lower than 13°, 14°, 15°, and 18°. In Argyllshire the lowest recorded temperature was 17°, yet even in this county we find that much damage from frost has been observed, while throughout the whole district fifteen out of twenty-five reporters speak to eggs being destroyed by frost, thirteen out of twenty-one report that they found eggs split, and sixteen out of twenty-seven state that a few unfertile eggs were left in the nests. The nests were fairly well filled and, except for the eggs which were believed to have been frosted, the clutches hatched out well, yet out of an average of 7·4 eggs in each nest only 3·7 young birds came to maturity —a result which cannot be altogether accounted for by the relatively few unfertile eggs left in the nests.

Remarks.—There seems to be definite evidence that the frost did cause some damage; but the extent of the damage was probably exaggerated owing to the necessity of finding some reason to account for the shortage of young birds in August. This shortage seems to have been due to losses after hatching rather than to damage to the eggs.

DISTRICT 2. ENGLAND NORTH-EAST—NORTHUMBERLAND, DURHAM, AND YORKSHIRE (N. RIDING).

10 Reports.

The frost was generally more severe than in the two last-mentioned districts—the readings being 7°, 7°, 9°, 10°, 11°, 13°, 16°, yet the majority of the reporters state that the eggs suffered no damage, and only one states that he found an egg split by frost. The eggs hatched out well, only a few being left in the nests, and many of these contained young chicks, thus showing that their failure was not due to the frost in April. There were few barren birds, and the coveys contained a fair average number of young birds.

Remarks.—The same puzzling results are again observed. Though the frost is more severe the losses seem to be less instead of greater.

DISTRICTS 7A AND 4A. ENGLAND, NORTH-WEST AND NORTH WALES — CUMBERLAND, WESTMORELAND, LANCASHIRE, CHESHIRE, WALES, MIDLAND COUNTIES — YORKSHIRE WEST RIDING, DERBYSHIRE.

16 Reports.

The reports from the north-west of England are complicated by the fact that the frost was accompanied by heavy snow, and any damage that was reported might have been.

due to the snow; as a matter of fact not much damage was reported. The eggs hatched out well; those that were left unhatched contained chicks. In many cases there were few barren birds, and the coveys were up to the average in numbers.

Remarks.—There are not many records of temperatures for this district, and from those supplied it would appear that the frost was not so severe as it was further north, 16° being the lowest recorded reading.

The deductions to be drawn from the foregoing analysis, though negative, are nevertheless of considerable interest. They may be summarised as follows:—

(1) Frost in the breeding season does not cause universal destruction to eggs.
(2) In some cases it seems to do little or no harm, even though relatively severe.
(3) In other cases it seems to do more harm even though relatively less severe.
(4) The effects of a hard frost in the breeding season are apt to be exaggerated, if from any other less obvious cause there happens to be a shortage of young birds in the shooting season.

How it happens that eggs in one district seem to be better able to withstand frost than those in other districts must remain a subject for conjecture. Acclimatisation appears a more probable solution than any other, for it is clearly brought out by the Reports that in the more rigorous climates of the north and east the eggs were less affected by frost than in the milder climate of the west. Possibly it may be that in the colder districts instinct teaches the parent birds to take greater precautions, *e.g.*, to nest under the shelter of long heather rather than in open situations. Many cases are recorded of Grouse protecting their eggs from frost by covering them with loose twigs of heather.

APPENDIX I.

SERIES OF MAPS SHOWING THE INCIDENCE OF "GROUSE DISEASE" IN FORMER YEARS.

By A. S. Leslie.

THE following series of maps has been prepared to show the localities in which "Grouse Disease" has occurred during the last thirty-eight years, and the local distribution of the various outbreaks.

Scotland alone has been dealt with, for the information obtained from that country on the subject of "Grouse Disease" has always been fuller and more accurate than from England.

The series of maps commences with the year 1872, which, with 1873, will always be notorious as the date of one of the most severe and widespread epidemics of "Grouse Disease" ever known. An endeavour was made to go back to 1867, the year of another serious outbreak which, especially in the Border districts, seems to have rivalled 1873 in severity; but at this earlier date the interest in the subject does not appear to have found expression in the form of recorded observations, and the evidence is scanty and inconclusive.[1]

The records have been obtained by a systematic search of private memoirs and published material, and of the latter the annual reports contained in the *Field* newspaper have been of the utmost value. Most of the material was collected at an early stage of the investigation when a sharp line of distinction was drawn between the severe outbreaks causing widespread mortality and the mild or sporadic cases which were not then believed to be cases of "Grouse Disease" in the true sense of the term. At that time the more serious attacks were alone thought worthy of mention, and the earlier maps in consequence contain a smaller number of recorded outbreaks than if a note had been made of every moor on which dead birds had been picked up. As the work of the Inquiry proceeded it became evident that the milder outbreaks of mortality were only different in degree, and not in kind, from the more serious ones, and in the later maps every place is marked from which even a single case of Strongylosis had been reported.

The maps were prepared by Dr Wilson, and were arranged and reproduced after his departure on the 1910 Antarctic Expedition.

In the original maps each place from which "Disease" was reported was marked by name, but for the present purpose it is thought undesirable to do more than indicate by a dot the district in which the outbreak occurred.

---

[1] But *vide* vol. i. chap. xxi. pp. 456-457.

Beginning with the year 1872 it will be seen that "Grouse Disease" was general throughout the greater part of Scotland, and when it is remembered that only the most severe epidemics were noted it may be imagined that the country as a whole was very severely affected. The really disastrous year, however, was 1873, when the mortality was so widespread that the stock was reduced to a condition from which it took years to recover. What moors were not cleared of Grouse in 1873 were swept by the scourge in 1874, and then there commenced a series of lean years during which there were few Grouse and little disease. The first appearance of another outbreak was in 1878 when a certain amount of mortality was reported, more especially in the south of Scotland. This district may have been more liable to attack owing to its having been less severely affected in 1873. The northern moors also had not long to wait before they were visited by another outbreak; in 1880 a sharp attack was reported from Moray, Banff, Perth, and Forfar. 1882 and 1883 were also bad years, but after that there followed a succession of healthy seasons up to the record years of 1886 and 1887, when a very severe outbreak occurred in the south of Scotland. In 1889 there was a widespread epidemic throughout the whole of Scotland, the disease being noticeably severe in Forfar and Kincardine; the sickness lingered through 1890, and broke out afresh in 1891. From 1892 to 1898 the country was never free from disease, though the principal centres of attack changed each year. Then followed two comparatively healthy years only to be succeeded by further scattered outbreaks.

In 1905, the year of the Committee's appointment, there was less disease than there had been for many years, a fact which at the time caused some disappointment, but which in reality was of the greatest assistance to the Committee, since it enabled them to study the natural history of the normal Grouse under the most favourable conditions. From that year onwards to the close of the Inquiry the history of each outbreak has been carefully followed, and an endeavour has been made to ascertain the predisposing causes of the epidemic.[1] No very serious outbreaks have occurred within the period of the Inquiry, and the fact that the maps for 1907 and 1908 show a very large number of disease centres is due rather to the more complete system of collecting information than to the severity of the attacks. Had the same facilities existed in 1872, 1873, 1874, 1880, 1887, 1889, 1891 the probability is that each of these years would have shown a very much larger number of cases. Indeed, it is believed that since the principles of stock regulation and moor management have come to be more generally recognised and practised, the conditions which gave rise to the disastrous outbreaks of "disease" in 1867 and 1873 no longer exist to the same extent as before.

The deduction to be drawn from the study of the series of maps is that there is no Grouse-producing district which can claim to be entirely immune from attack. Occasionally an individual moor may show a clear record for a long period; but even this is probably due to strict control of stock and freedom from immigration rather than because that particular piece of ground possesses characteristics which protect the Grouse stock from disease. The only true test of freedom from disease is the dissection of the birds themselves. If it can be shown by dissection that the birds from any particular moor are at all times free from the Strongyle worm it may fairly be claimed that that moor is disease-free. But up to now only one moor has been formed which reaches this exceptional standard, and that moor is affected by abnormal circumstances.[1]

---

[1] *Vide* Appendix G.

The fact that no district is immune from "Grouse Disease" is proved by the two maps which are reproduced at the end of the series. These maps show approximately the districts in England and Scotland respectively from which authentic Reports of "Grouse Disease" have been received during the past thirty-eight years. Where reports were received from the same centre in more than one year additional dots were marked as close as possible to the correct spot upon the map, and thus, though the maps are useful as showing the general distribution of mortality, they must not be regarded as a reliable guide to the exact position of the moors on which the outbreaks occurred.

In spite of the fact that the reporting in some centres was better organised than in others, it will be seen that during the period under review the mortality has been impartially distributed amongst the Grouse-producing districts of England and Scotland, and moreover that it bears an exact proportion to the importance of each district from a sporting point of view. Thus it will be seen that on the finest Grouse ground of Caithness, Ross, Inverness, Banff, Aberdeen, Forfar, Perth, Argyll, and the Border counties disease has occurred more frequently than in the lightly stocked areas of the same countries, while from the extreme west coast and the deer forests of the Central Highlands little or no mortality has been reported. The map of Northern England shows the same results, though not quite so conclusively, since the reports from that country are less complete than from Scotland.

"Grouse Disease" then is not confined to any particular geographical area, but seems to bear a relation to the number of Grouse in each moorland district, and the maps accordingly form an interesting record of the districts in which the largest numbers of Grouse are to be found.

An attempt has been made to trace a connection between the numbers of Grouse, and their liability to "disease" in a particular district, and the geological formation or meteorological conditions in that district. So far as geological formations are concerned there does not appear to be any close connection. The best Grouse-producing district in Caithness has a mineral sub-soil of old red sandstone on the east and granite on the west; Sutherland, in addition to the above-named rocks, has oolites and gneiss, Easter Ross consists principally of old red sandstone. The famous Grouse moors of Strathnairn, Strathdearn, and Badenoch lie principally on a bed of gneiss or gneissose rocks; the equally productive moors of Upper Banffshire on quartzite, mica schist, and graphitic mica schist with smaller areas of old red sandstone and granite. The upper districts of

---

[1] The moor in question is Tentsmuir in the county of Fife. A stretch of sandy soil of about 1,000 acres lying on the edge of the North Sea, and only a few feet above high water mark—it has a good but somewhat irregular growth of heather. Until 1872 there were no Grouse on the moor, but in that year a few wild birds were turned down, and speedily became established. The moor now yields an annual bag of from forty to sixty brace. This moor is entirely free from any appearance of Strongylosis, and the Grouse obtained from it are the only Grouse examined by the Committee which, on dissection, show no trace of the Strongyle worm. The absence of this parasite may be due to the fact that the moor is isolated from other Grouse ground; but this can hardly be the correct explanation, seeing that the original wild birds by which the moor was stocked must presumably have been infected with the normal quota of this nematode. A more probable explanation is that the salt from the sea spray has so impregnated the ground as to make it impossible for the worm to exist, for it has been proved by experiment that even a mild solution of salt is fatal to the Strongyle in the larval stage. On the other hand, hand-reared Grouse are often entirely free of the Strongyle worm, and it is for this reason that they are the only birds which can be usefully employed for experimental purposes. (*Vide* Appendix G.)

Strathdon and Strathdee contain an assortment of nearly all the above-named formations with a few others in parts. The Forfarshire and Central Perthshire moors lie principally on quartzite and mica schist. Ayr, Strathclyde, and the Lothians contain a large assortment of different carboniferous rocks, while in the Southern Highlands from Wigtown on the west to Berwick on the east the most representative formations are graptolite shale, Llandovery, old red sandstone, Ludlow, and Wenlock.

With regard to meteorological conditions the case is different, as may be seen at a glance from the Rainfall Map of Scotland published by Messrs Bartholomew for the *Journal of the Scottish Meteorological Society* for the years 1866 to 1890, and here reproduced by the kind permission of Messrs Bartholomew and of the Society. It will be seen that the principal Grouse-producing areas coincide almost exactly with the districts of low and moderate rainfall, the only exceptions being in the western districts of Sutherland and Ross and the islands of the Outer Hebrides. Whether the heavy rainfall has a directly detrimental effect upon the Grouse, or merely affects it indirectly by preventing the best development of the heather on which it feeds, may be a matter of conjecture, though the latter seems the most probable explanation. The fact remains that where the rainfall is heavy Grouse are few, and it is feared that this fact will always prevent the Grouse moors in certain rainy districts from being brought to the same standard of productiveness as in more favoured regions.

The points brought out by the series of maps may be summarised as follows :—

(1) "Grouse Disease" is one of the natural risks to which Grouse are subject, and is to be found wherever Grouse are numerous.

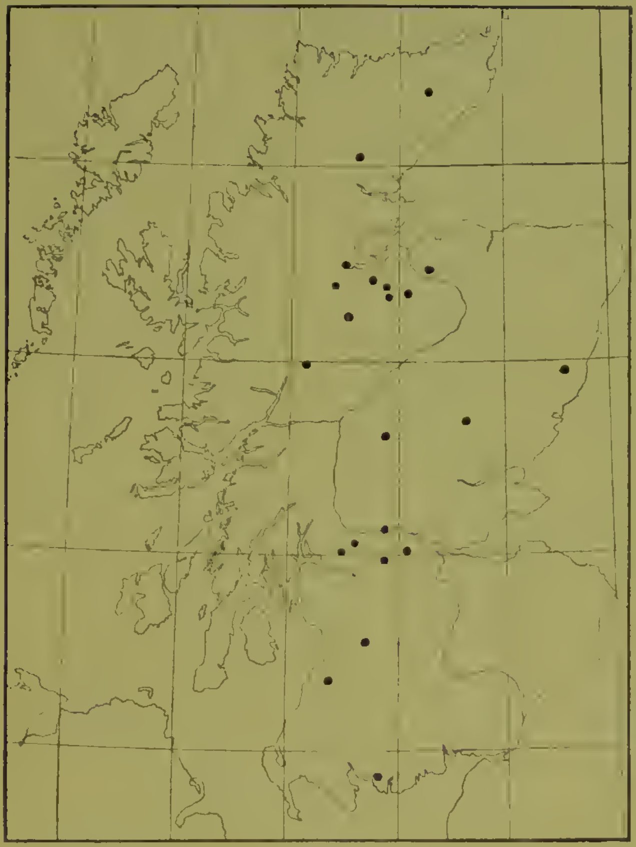
(2) Except in specially favourable seasons there is always a certain amount of "Grouse Disease" in one district or another.

(3) "Grouse Disease" does not usually persist in the same locality for more than one, or two years. This is probably due to the fact that by the reduction of the stock the risk of further attack is lessened.

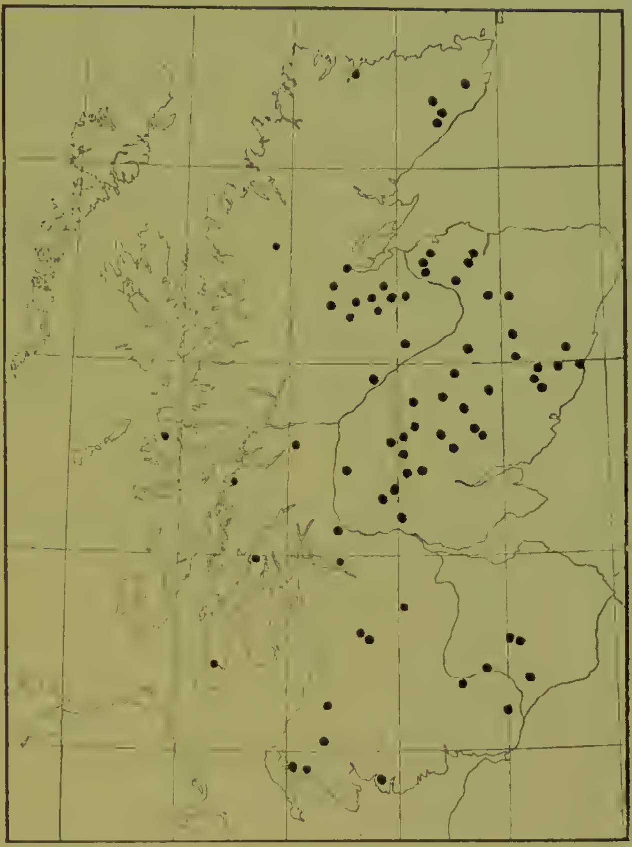
(4) There is no connection between "Grouse Disease" and the geological formation of the district in which it occurs.

(5) Where the rainfall is heavy there are few Grouse—and
Where the rainfall is heavy there is little "Grouse Disease."

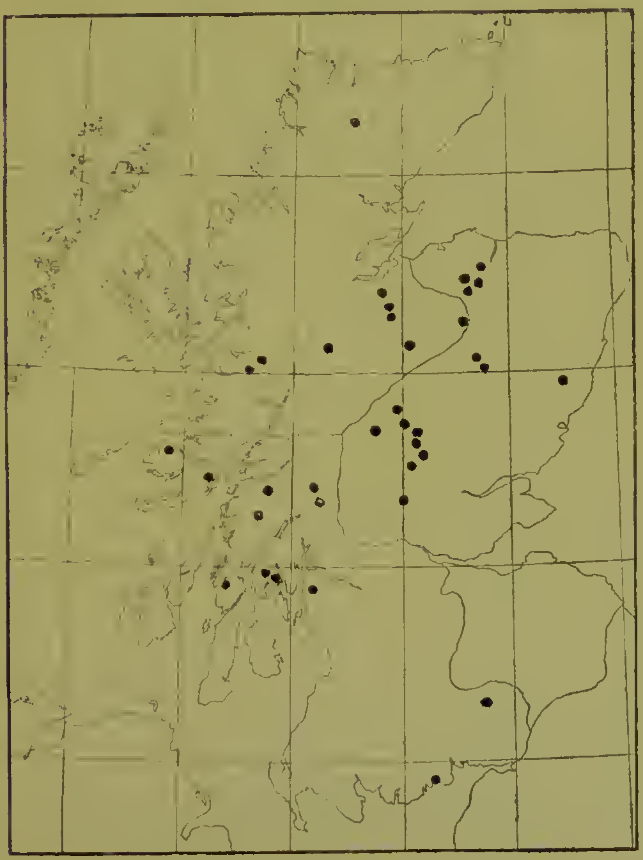
1872



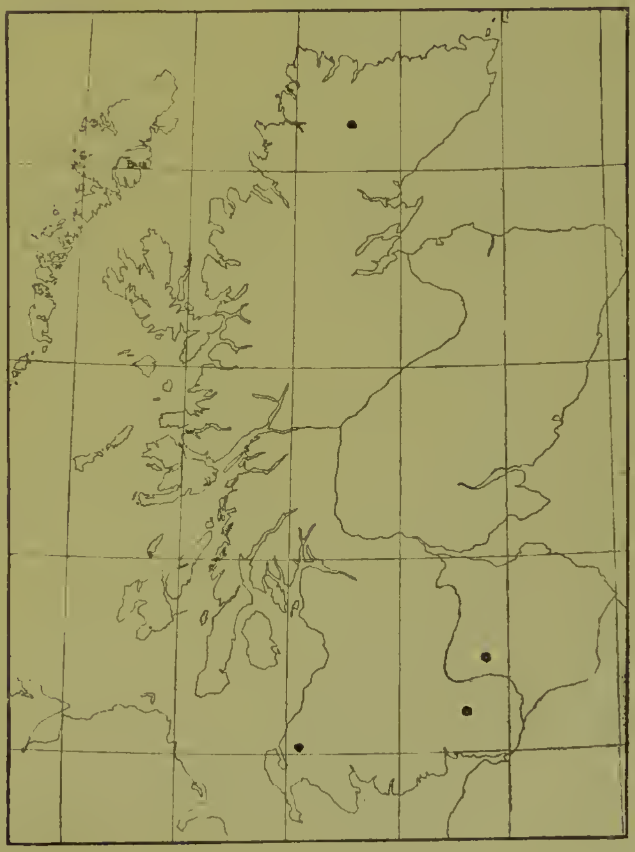
1873



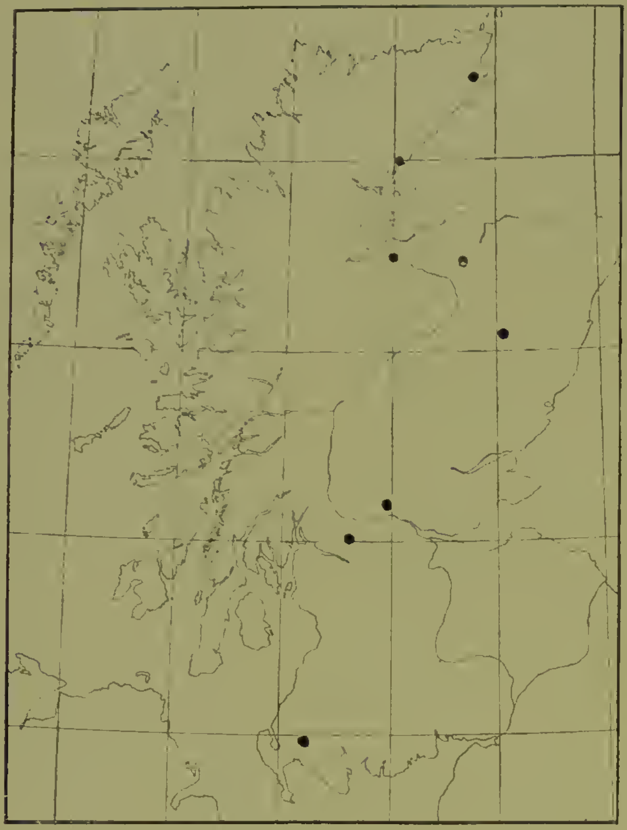
1874



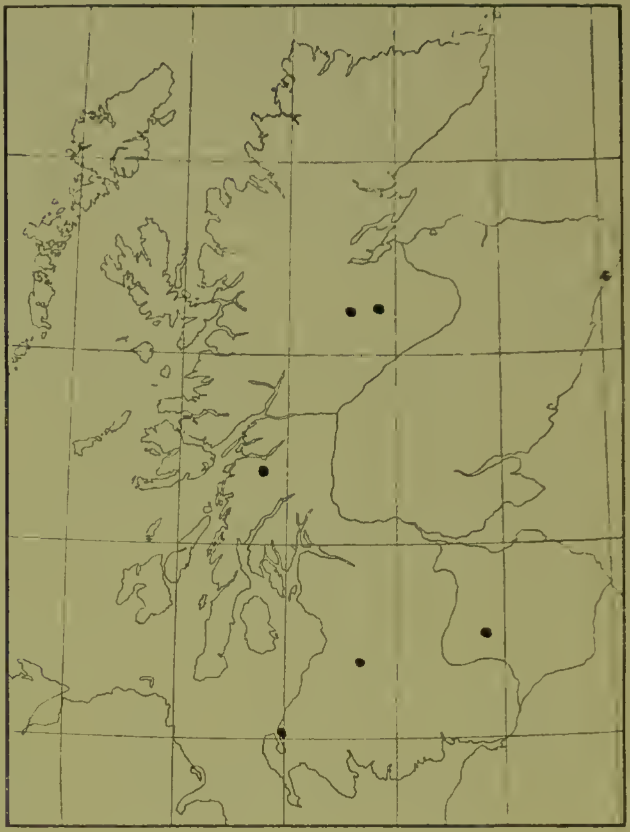
1875



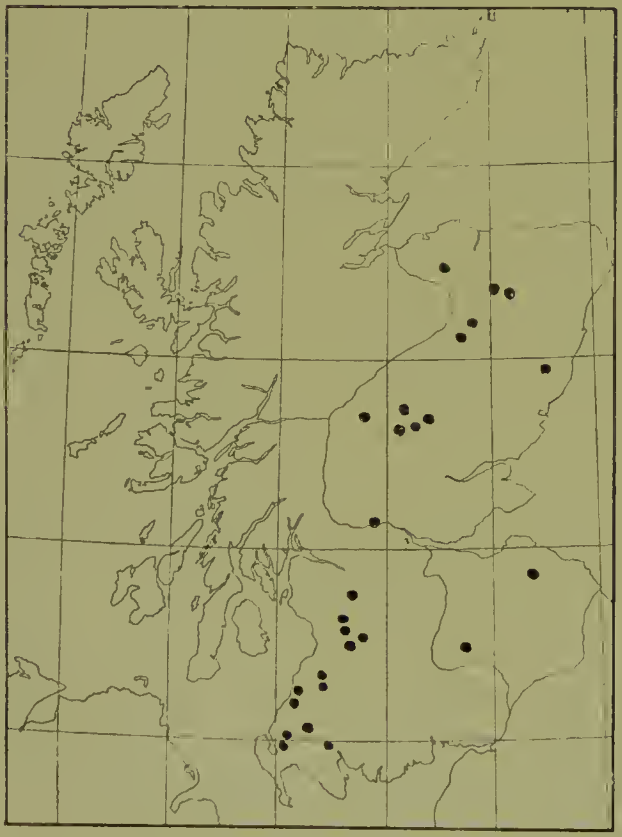
1876



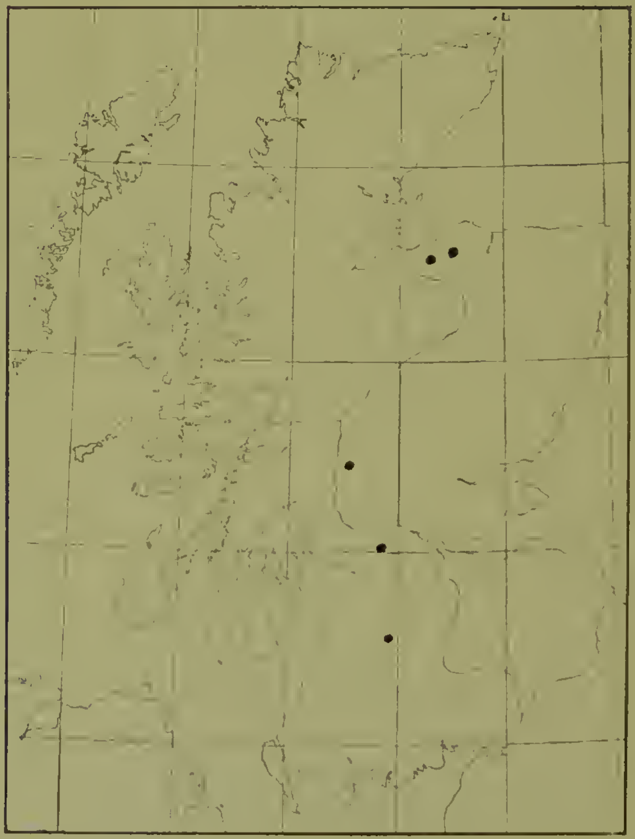
1877

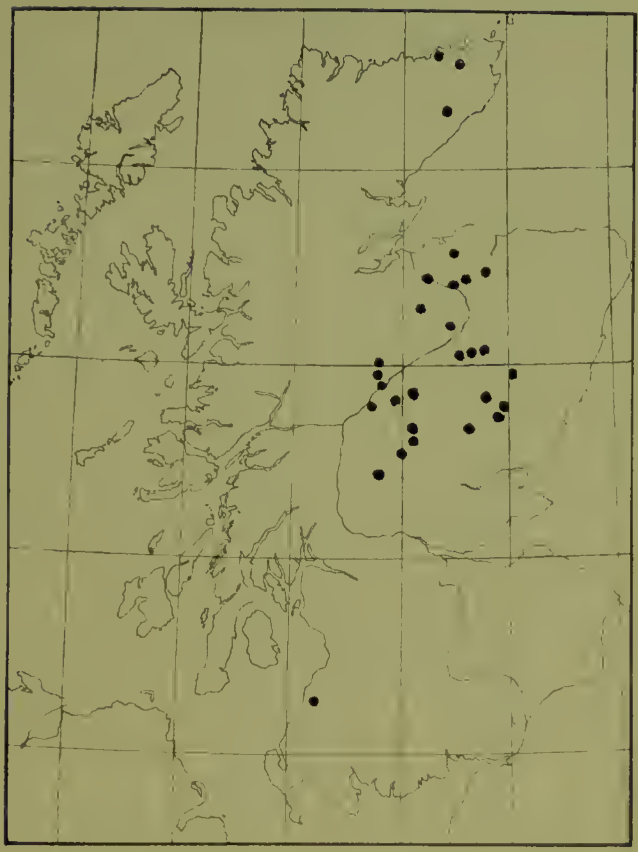


1878

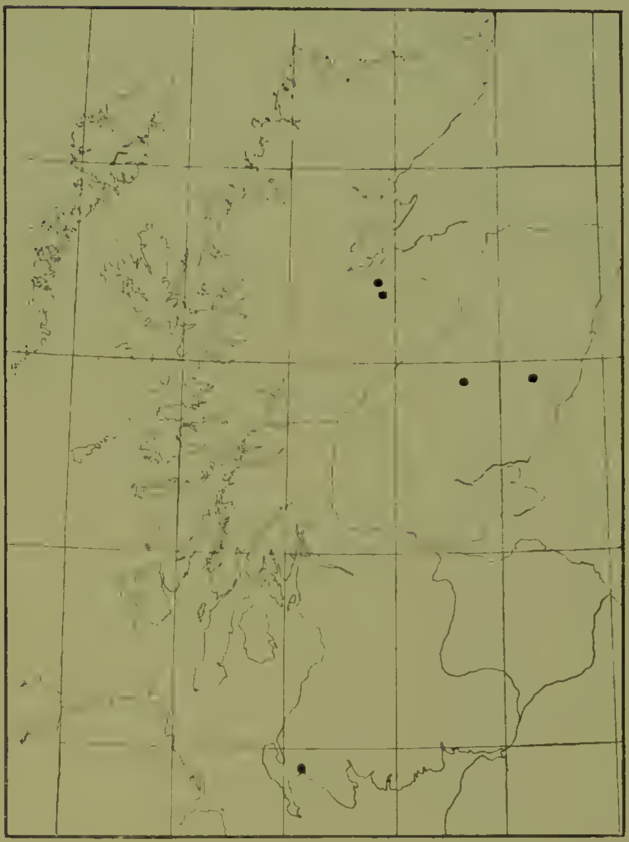


1879

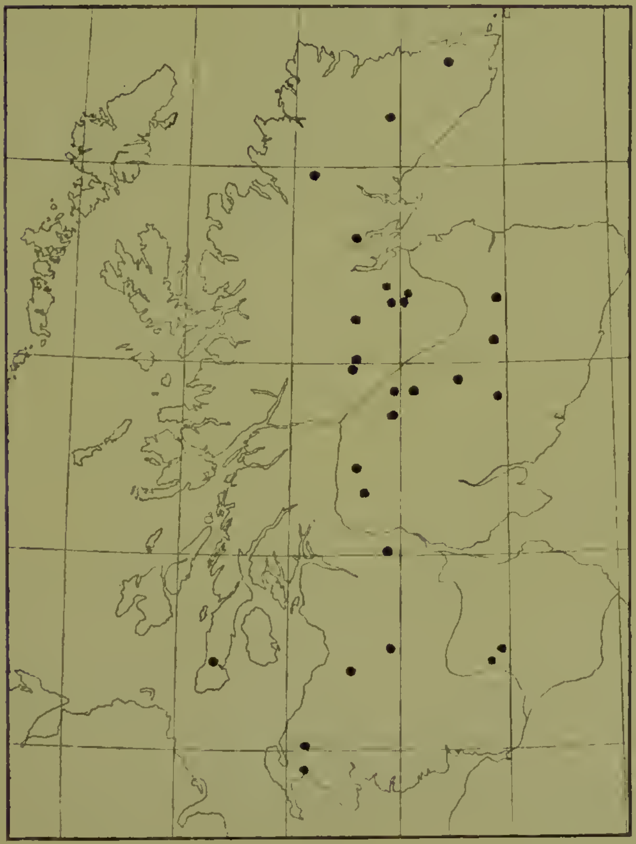




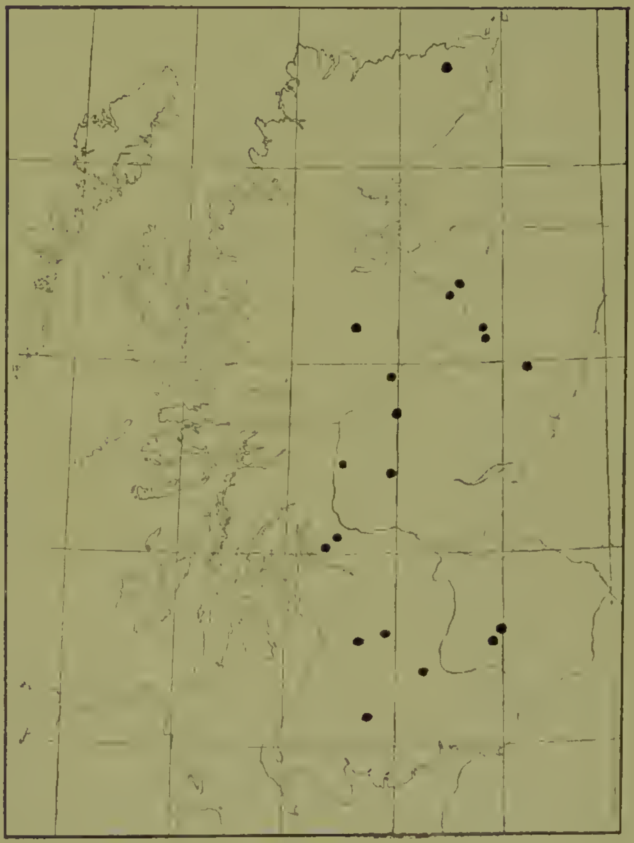
1880



1881

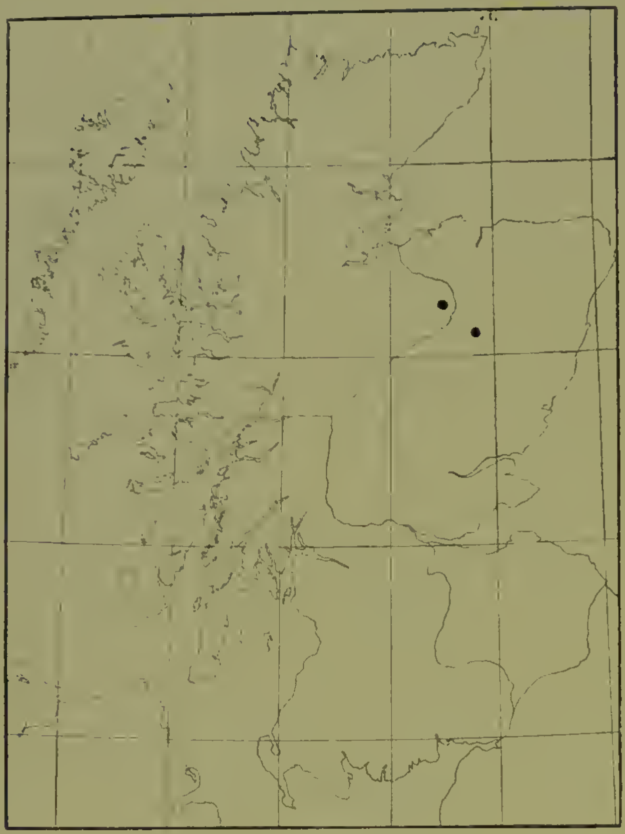


1882

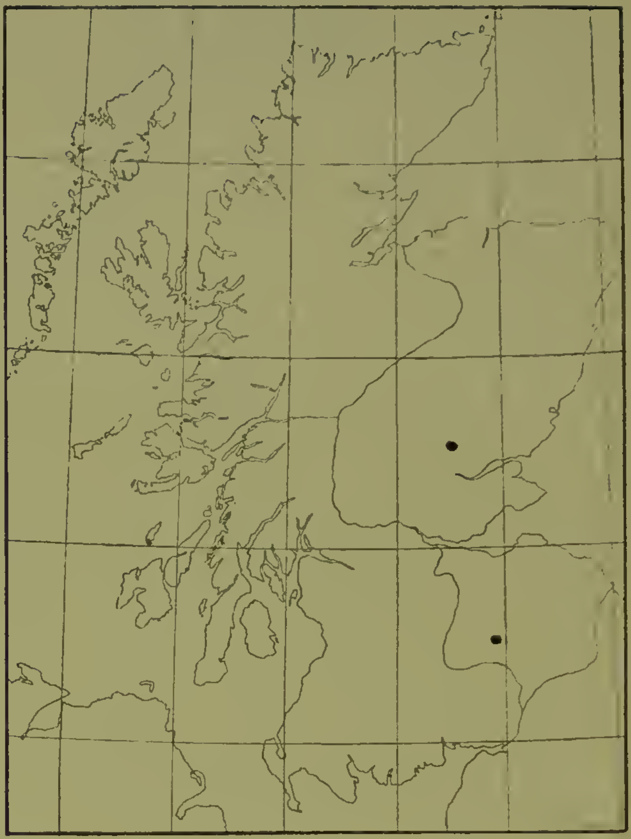


1883

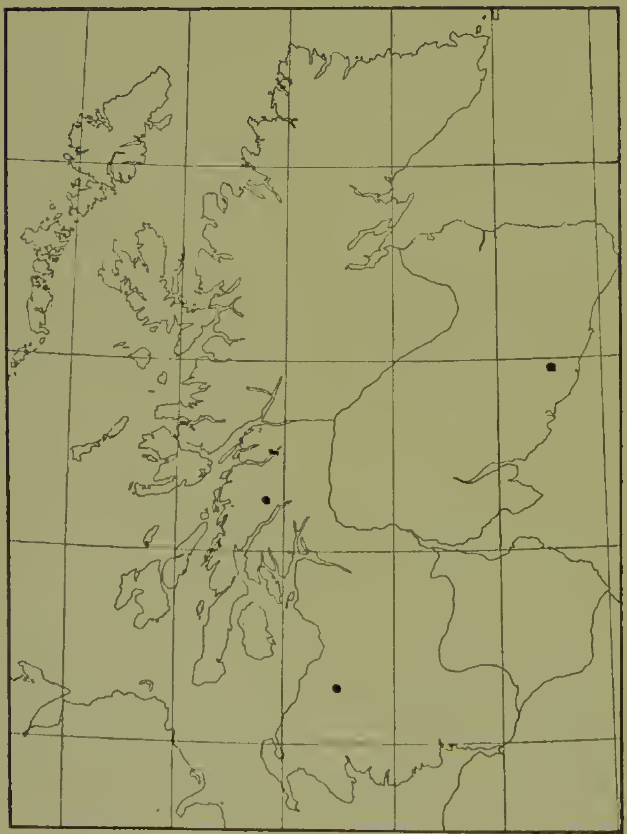
1884



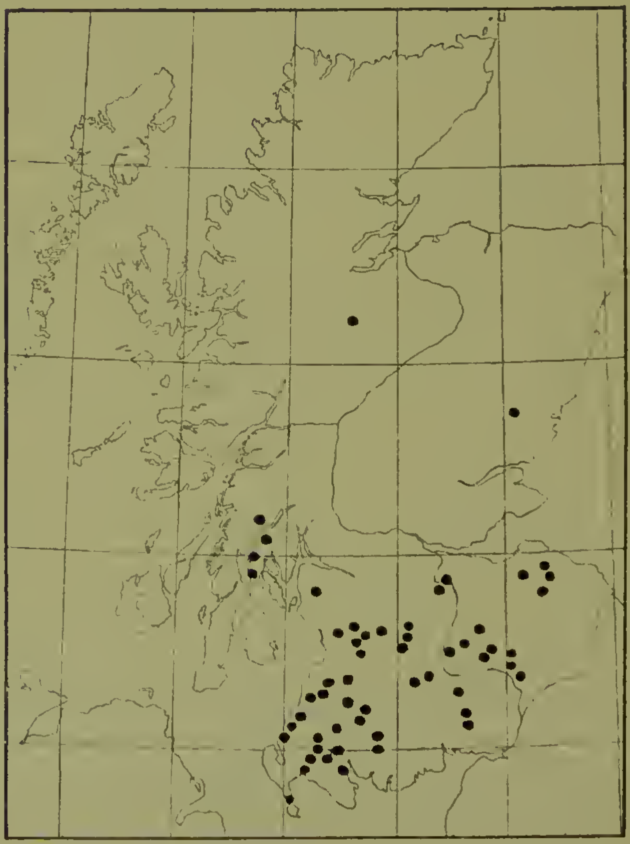
1885



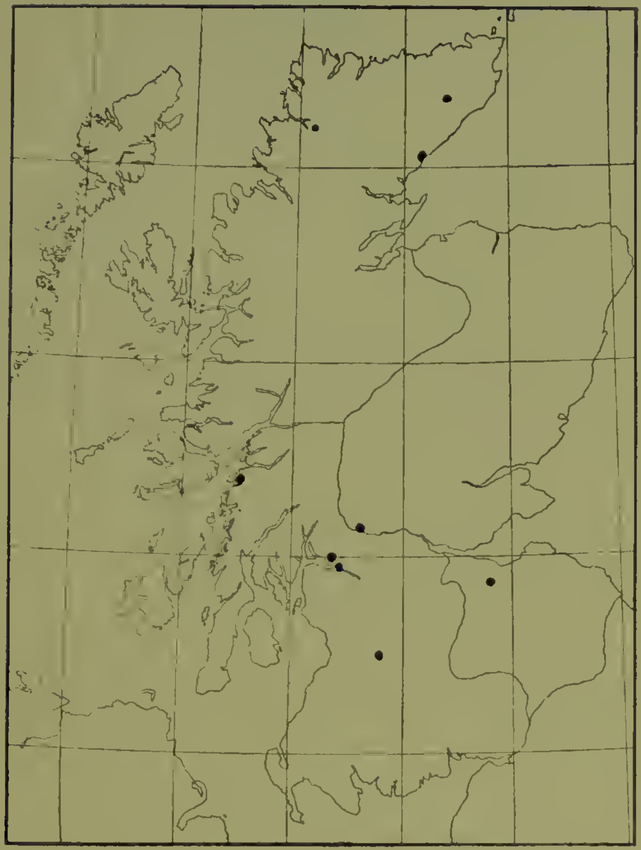
1886



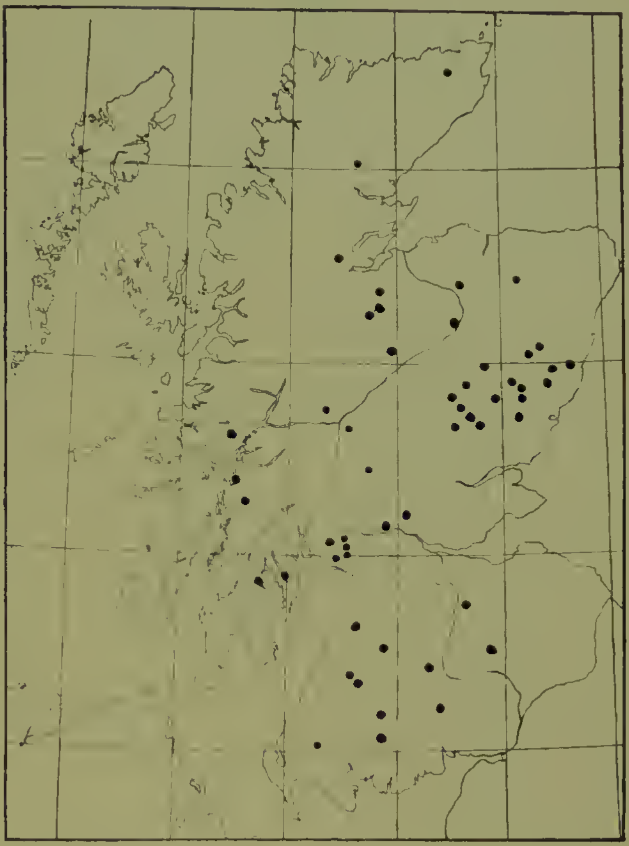
1887



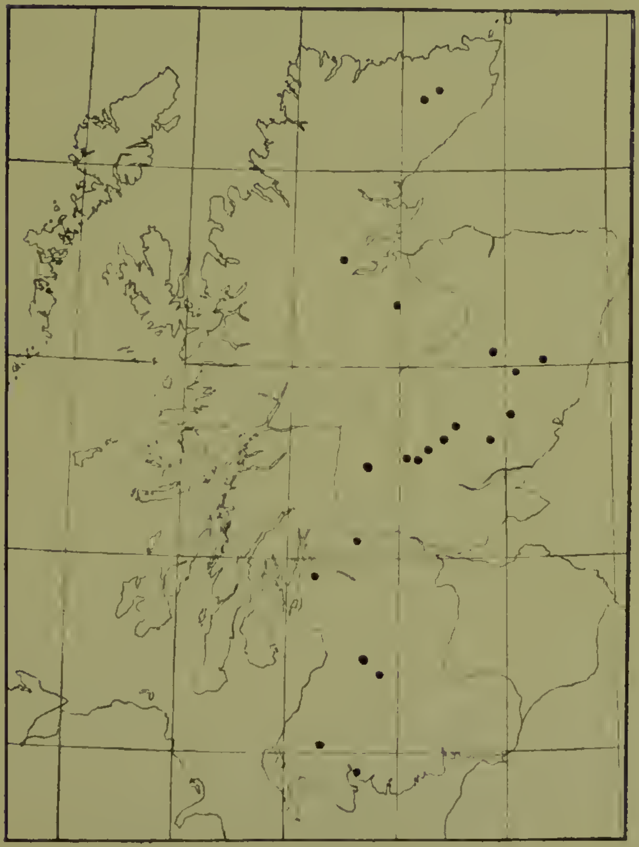
1888



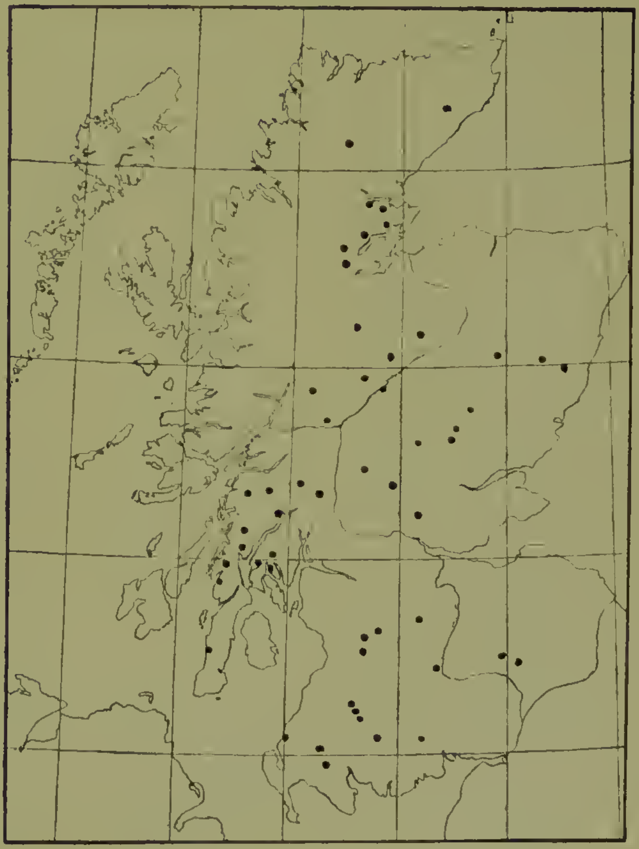
1889



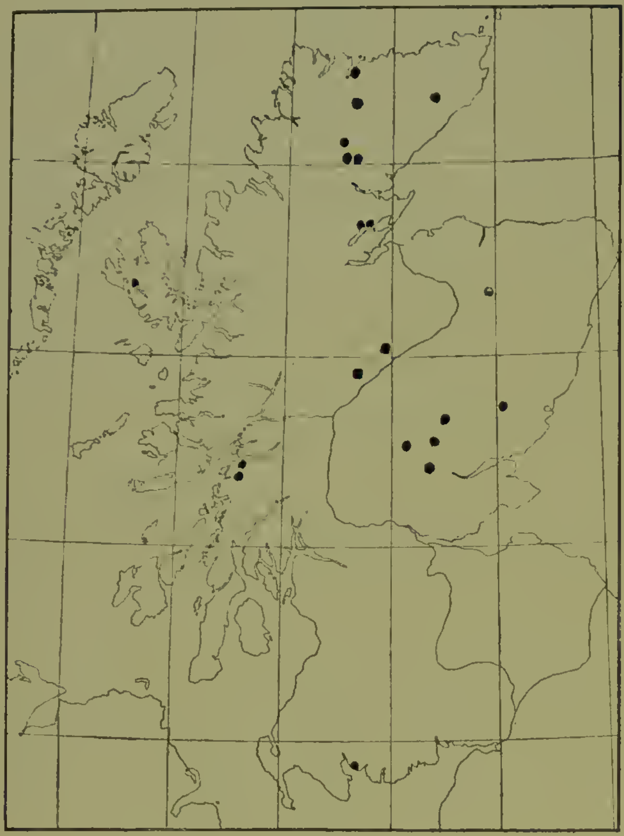
1890



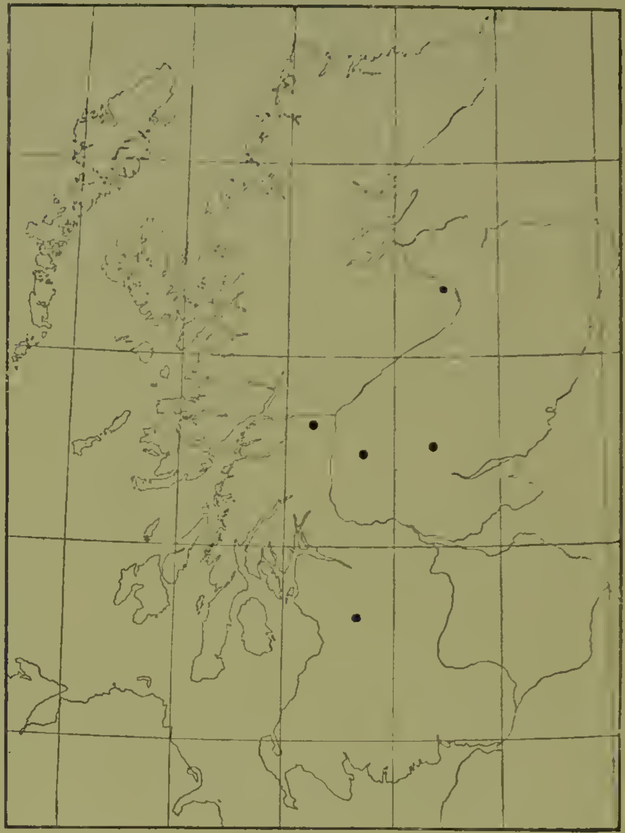
1891



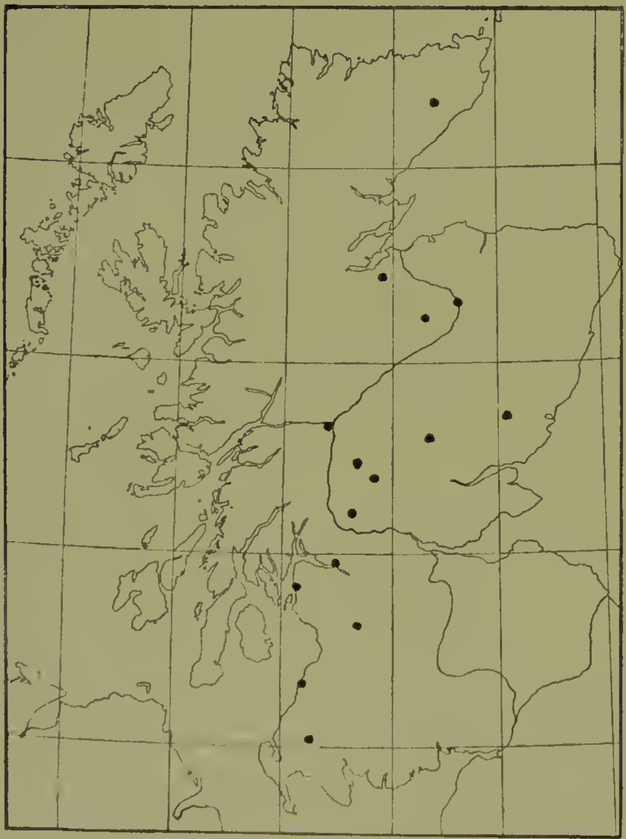
1892



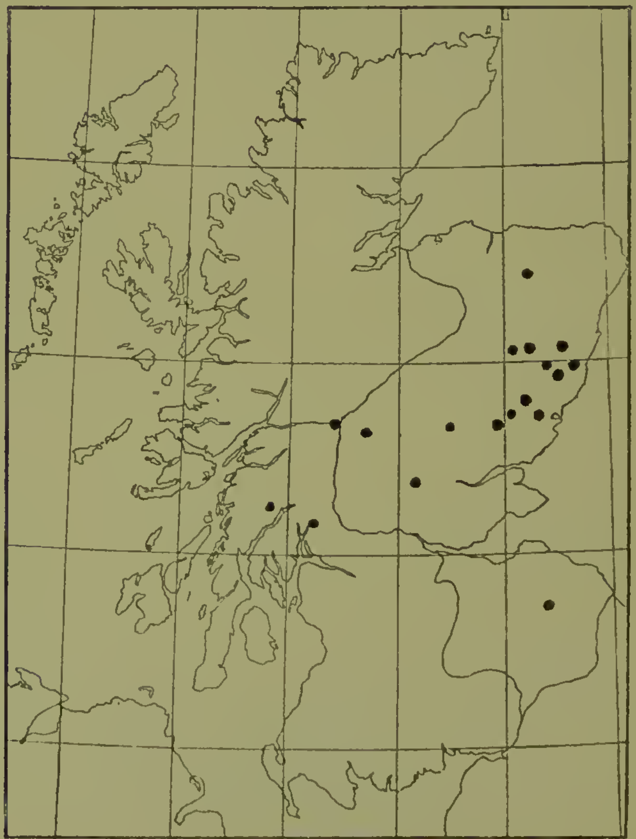
1893



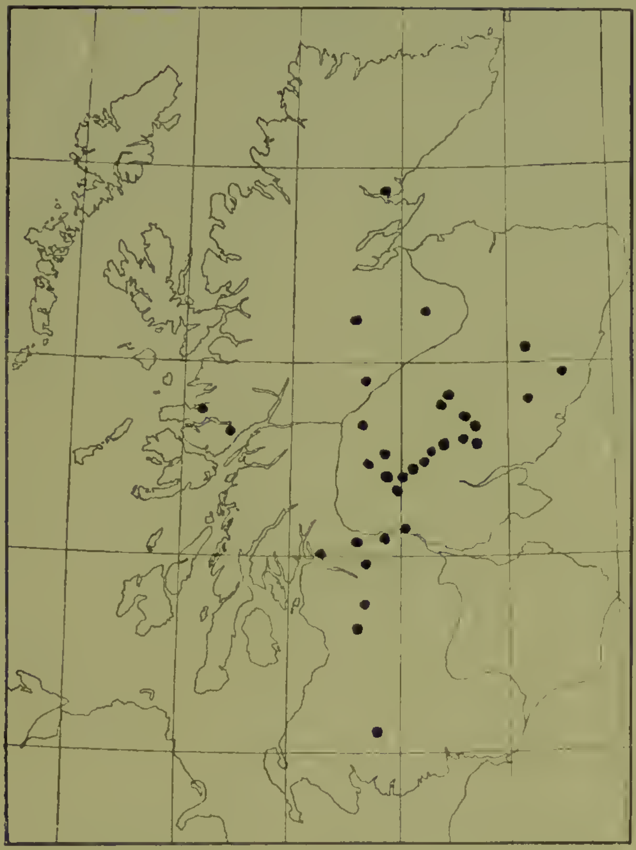
1894



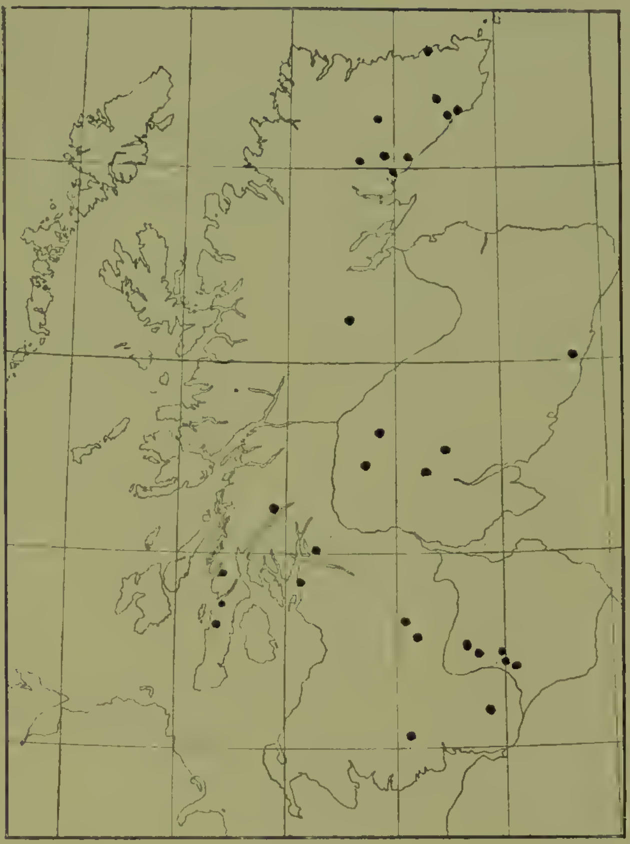
1895



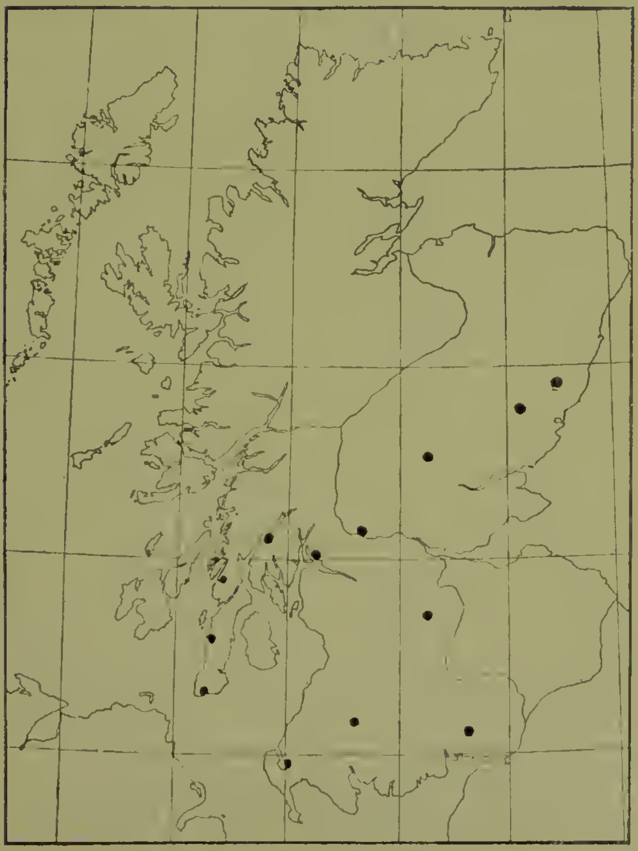
1896



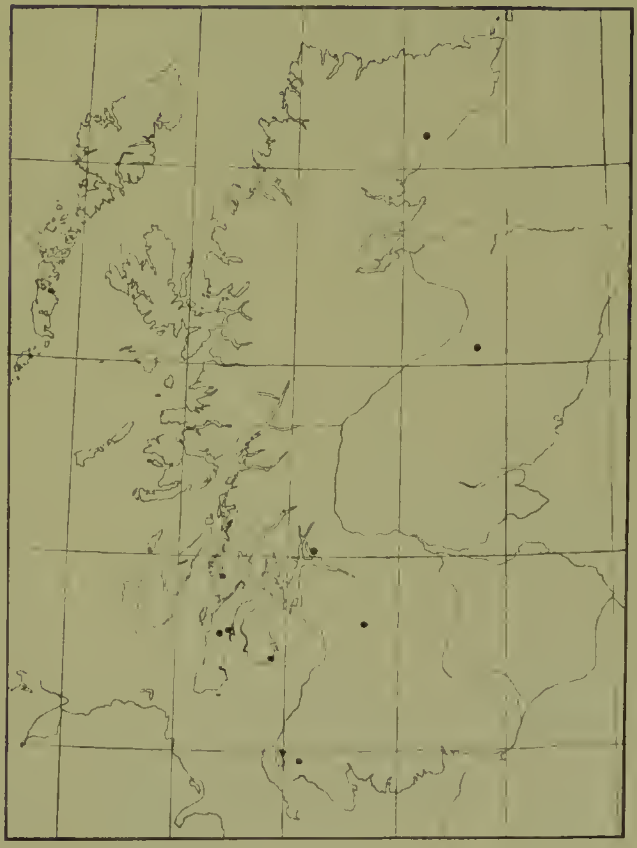
1897



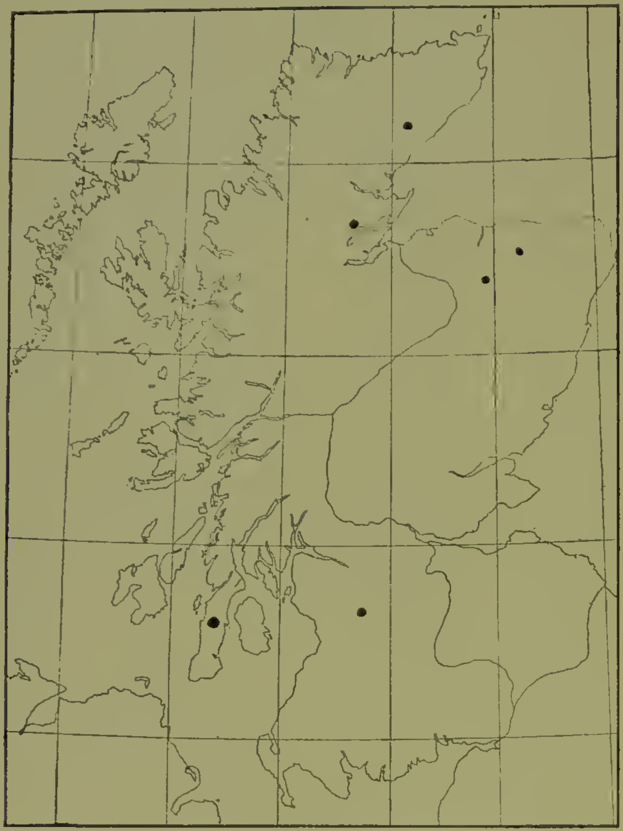
1898



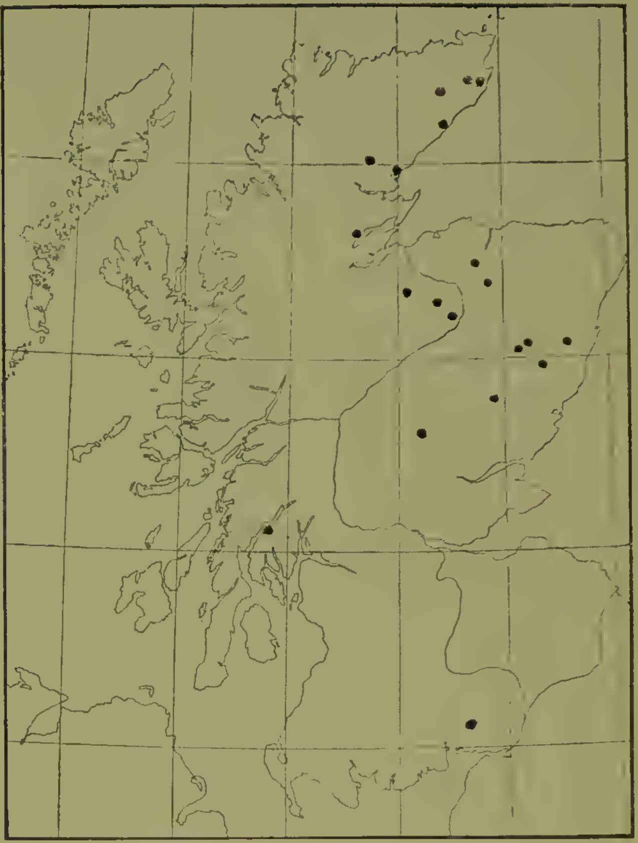
1899



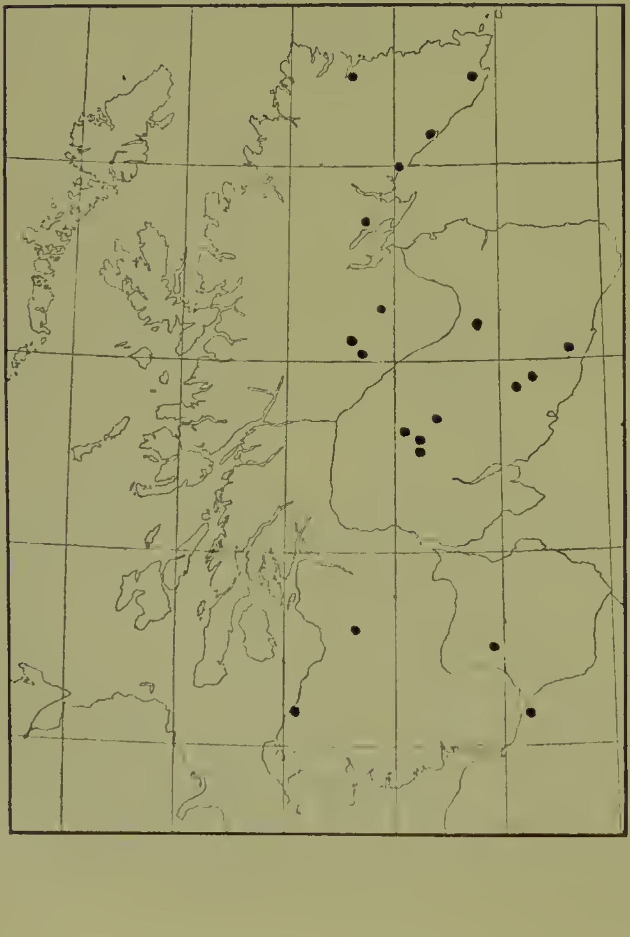
1900



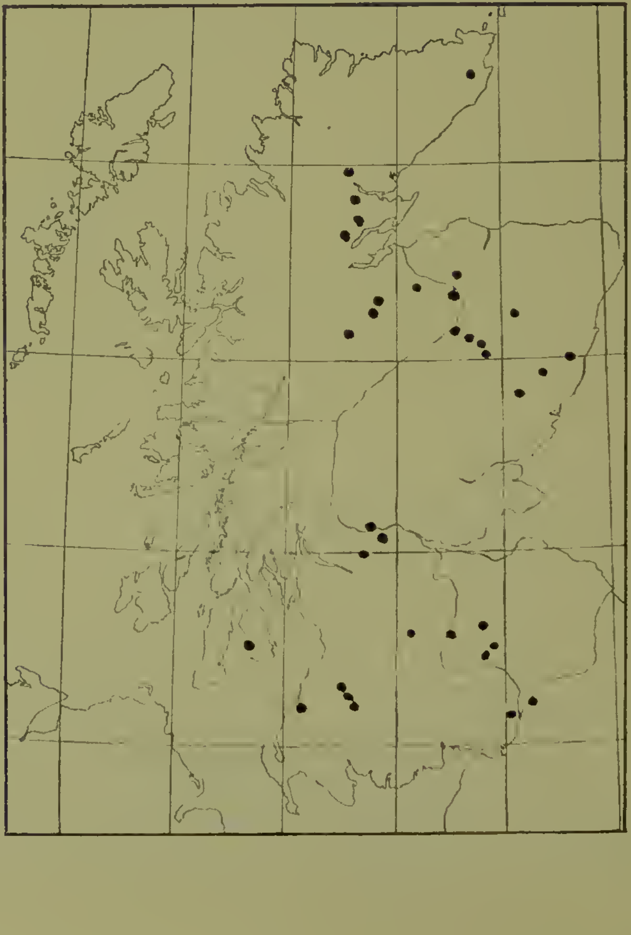
1901



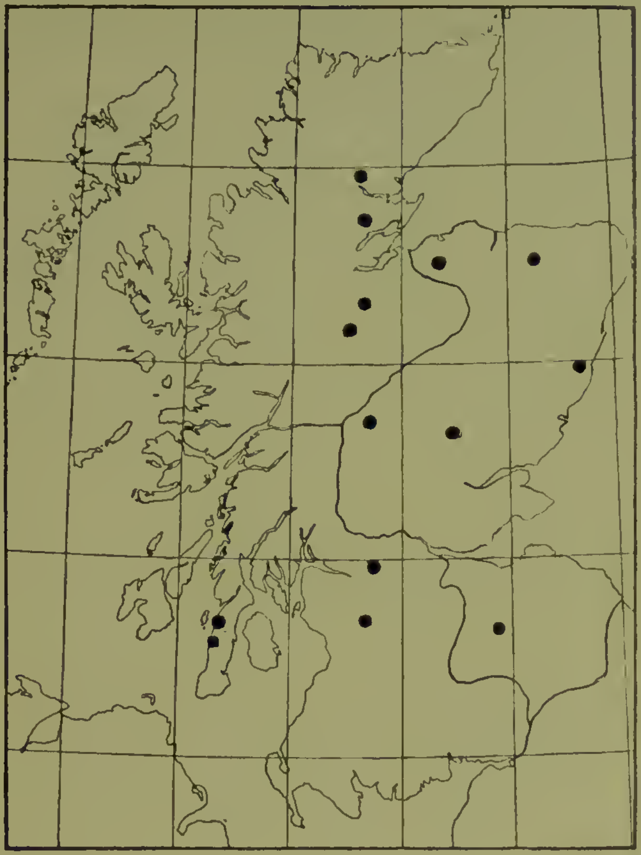
1902



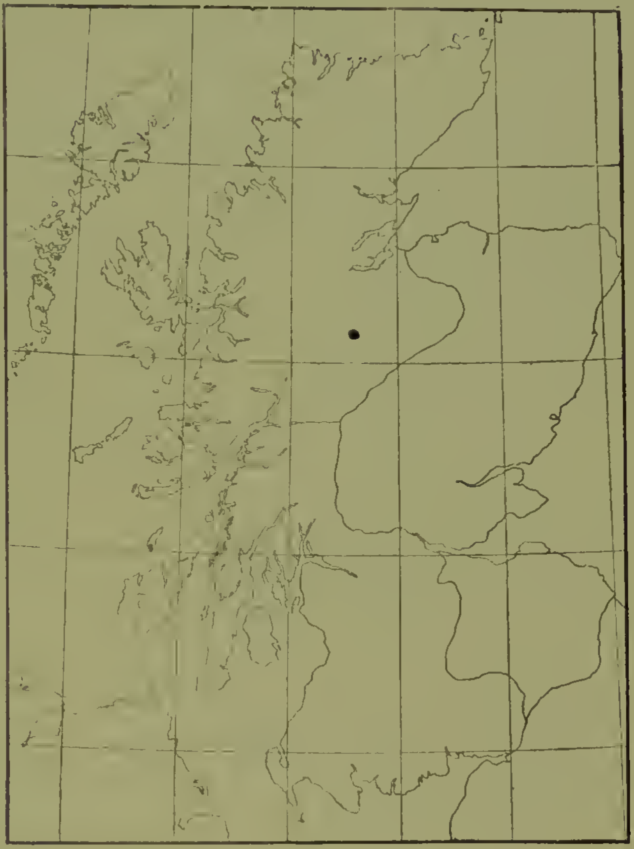
1903



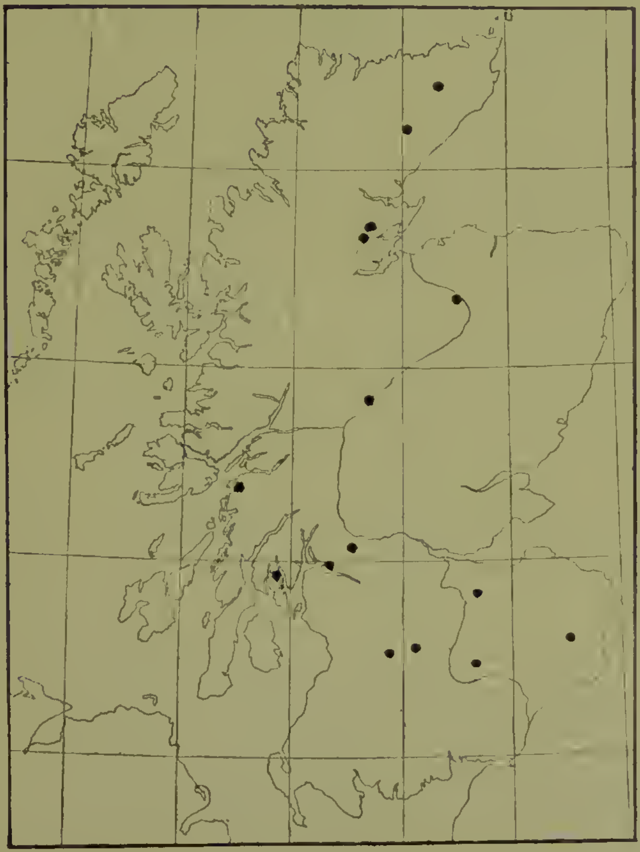
1904



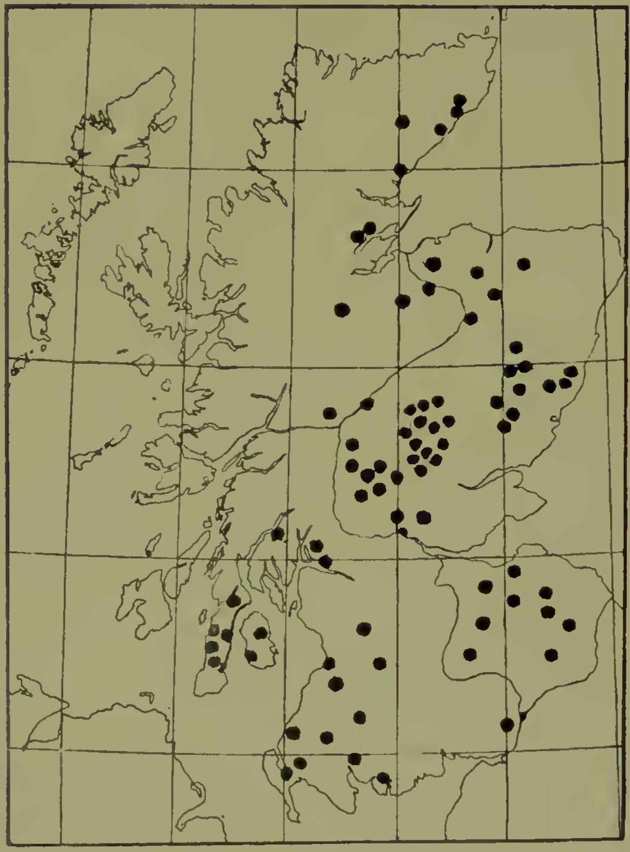
1905



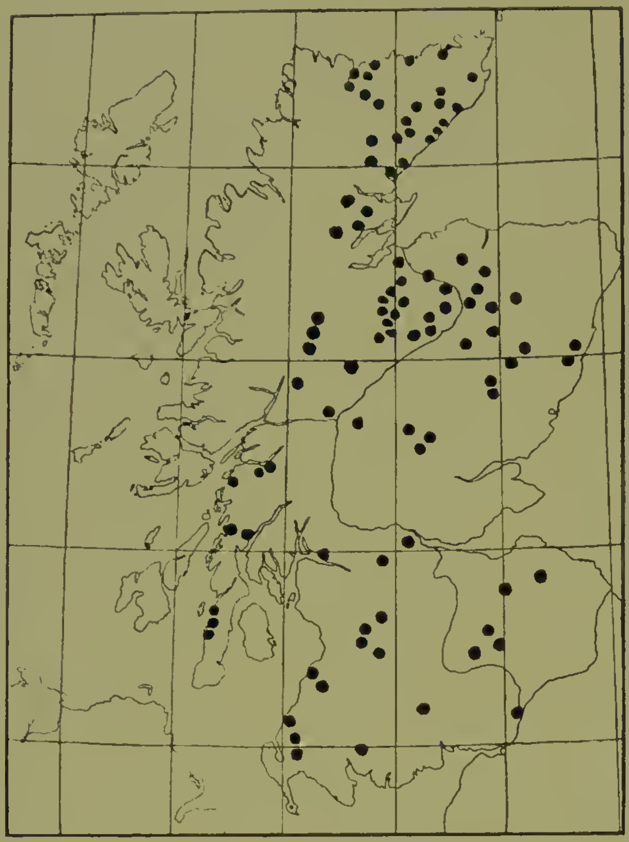
1906



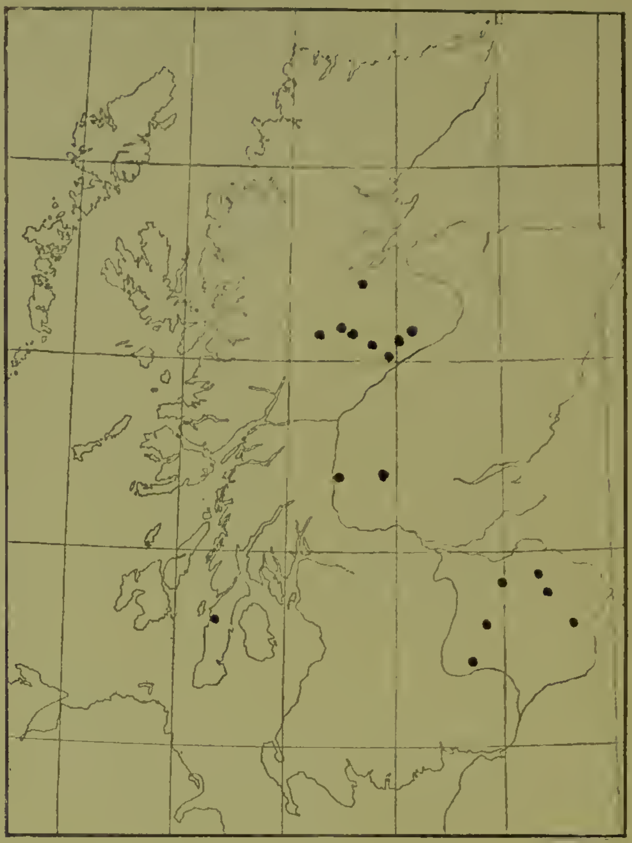
1907



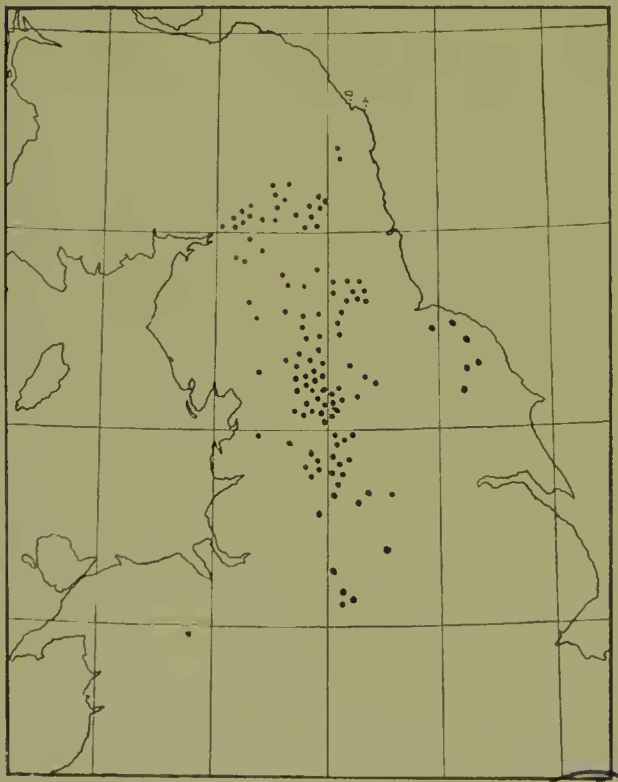
1908



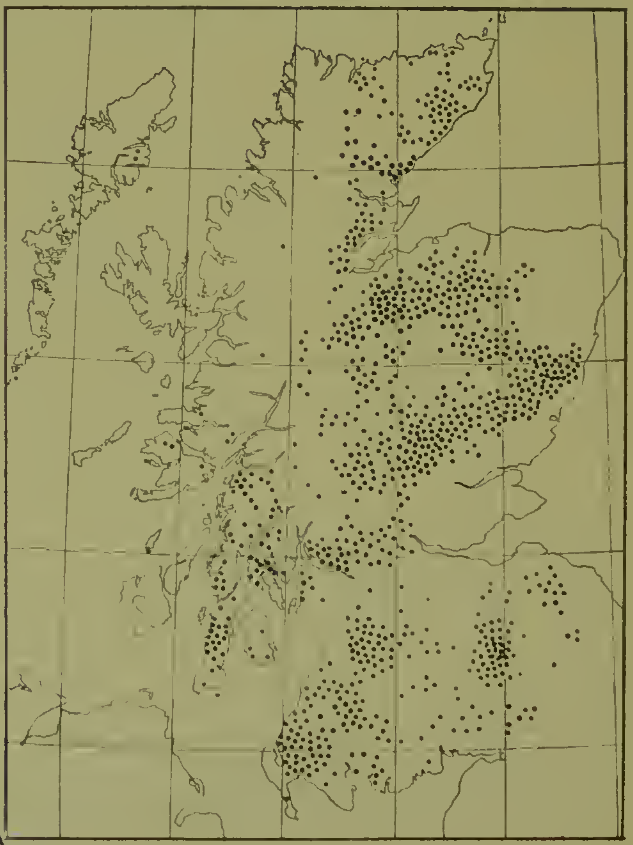
1909



MAP SHEWING THE PRINCIPAL CENTRES OF OUTBREAKS OF GROUSE DISEASE IN ENGLAND DURING THE PERIOD FROM 1872 TO 1909 INCLUSIVE.



MAP SHEWING THE PRINCIPAL CENTRES OF OUTBREAKS OF GROUSE DISEASE IN SCOTLAND DURING THE PERIOD FROM 1872 TO 1909 INCLUSIVE.

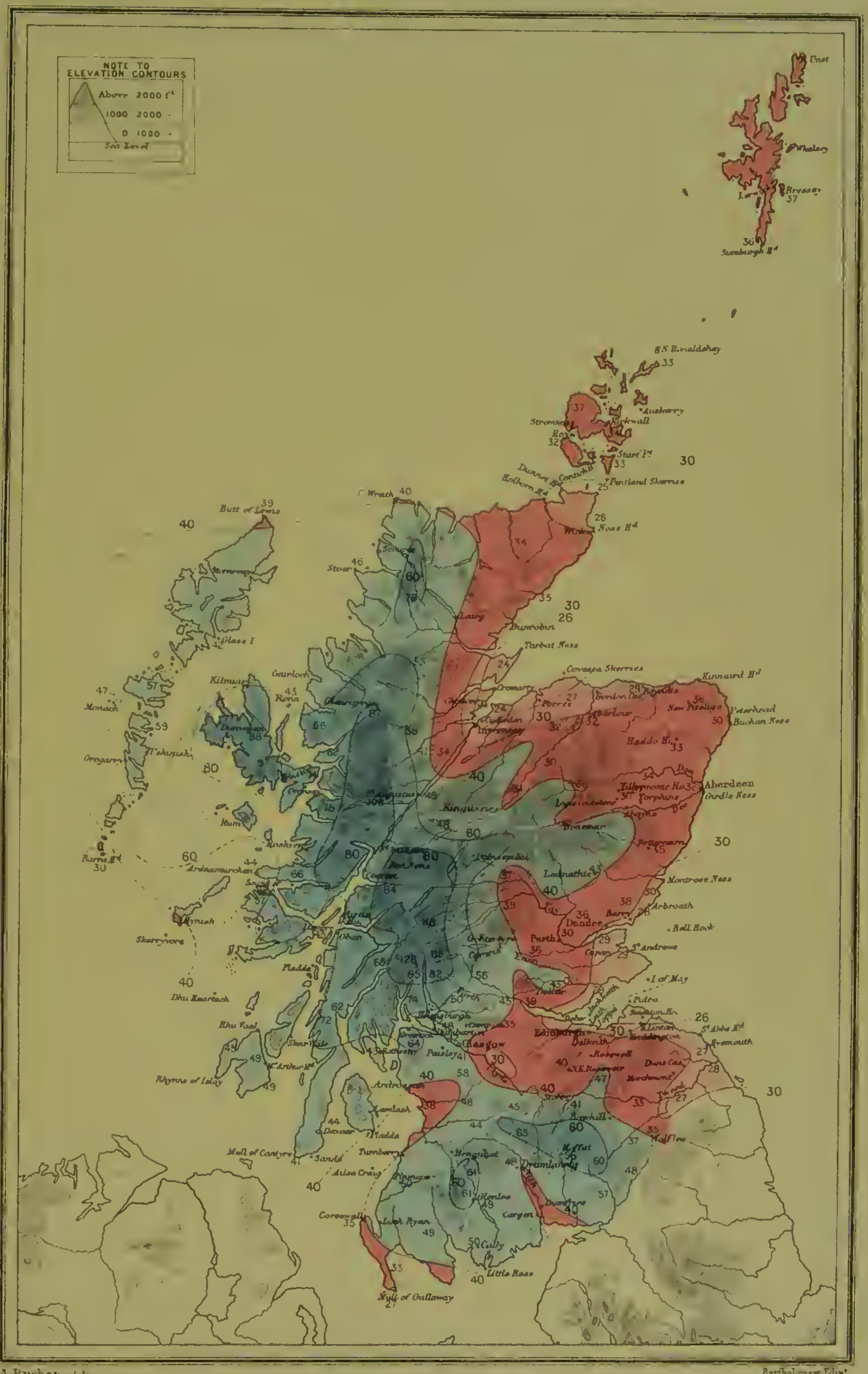


WELLCOME LIBRARY INSTITUTE

Plate LXX.

RAINFALL OF SCOTLAND FOR 25 YEARS, 1866–90

MEAN ANNUAL



A. Buchan, del.

Bartholomew, Edin.

Scale of Rainfall in Inches

UNDER 30	30 – 40	40 – 60	60 – 80	ABOVE 80

Reprinted from the
Journal of the Scottish Meteorological Society

Printed at
The Edinburgh Press,
9 and 11 Young Street.